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Gastromyceteae Stahelianae.

Von Ed. Fischer.

Vor einer Anzahl von Jahren erhielt der Verfasser dieses Aufsatzes von Herrn Professor Dr. G. Stahel in Paramaribo außerordentlich schönes Material von Gastromyceten, das dieser teils in der Küstenregion von Surinam, teils auf größeren Expeditionen ins Innere dieses Landes zusammengebracht hat. Die Konservierung in Alkohol, sowie der Umstand, daß darauf Bedacht genommen worden war, die Fruchtkörper in verschiedenen Entwicklungsstadien zu sammeln, gab dieser Kollektion einen ganz besonderen Wert und ermöglichte eine weit über die noch heute vielfach übliche, leider so oft ungenügende äußere Formbeschreibung reifer Zustände hinausgehende Untersuchung. Einen Teil dieses Materials — vor allem waren es die Phalloideen — haben wir schon früher bearbeitet und verschiedene Aufsätze darüber publiziert, ein anderer Teil ist aber bisher noch unveröffentlicht geblieben. Diesen lassen wir hier folgen; wir fügen aber, um ein vollständigeres Bild zu geben, der Aufzählung auch die früher untersuchten Arten bei. Es ist mir ein Bedürfnis, an dieser Stelle Herrn Prof. Dr. Stahel nochmals meinen wärmsten Dank zum Ausdruck zu bringen.

Die Nomenklatur, welche wir im folgenden zur Anwendung bringen, ist die unserer kürzlich veröffentlichten Darstellung der Gastromyceten in der 2. Auflage von Engler und Prantl, Natürliche Pflanzenfamilien Bd. VIIa.

Hysterangiaceen

Protubera maracuja Alfr. Möller in Brasilische Pilzblumen (Heft 7 von A. F. W. Schimper, Botanische Mitteilungen aus den Tropen) Jena 1895, p. 10. — Hendrikstop, Surinam. Expedition vom Frühjahr 1922, beim Endcamp, 600 m über Meer, auf faulem Holz ziemlich häufig, 8., 9. und 11. März 1922, leg. G. Stahel.

Von diesem zuerst durch Alfred Möller (l. c.) in Brasilien, seither aber auch von T. Petch[1]) in Ceylon und von Boedijn[1a]) aus Sumatra nachgewiesenen Pilz lagen uns Fruchtkörper in den verschieden-

[1]) T. Petch, Further notes on the Phalloideae of Ceylon, Annals of the Royal Bot. Gardens Peradeniya 5 I (1911), p. 19.

[1a]) K. B. Boedijn, The Phalloideae of the Netherlands East Indies. Bull. Jardin botanique de Buitenzorg Sér. III Vol. 12 (1932), p. 75.

sten Altersstadien vor. Der größte hatte einen Längsdurchmesser von fast 5 cm. Die jüngsten Exemplare zeigten bezüglich der Glebaanlage ganz die von Alfr. Möller beschriebenen Verhältnisse. — Es sei hier nur ein Punkt näher berührt, den H. Lohwag[2]) als revisionsbedürftig hervorhebt. Es handelt sich um folgendes: Der Fruchtkörper von *Protubera* ist nach Möller von einer Rindenschicht aus gebräuntem Pseudoparenchym umschlossen, welche die Volvagallertschicht überkleidet. Nun faßt Lohwag diese peridiale Pseudoparenchymschicht als ein Homologon des Hymeniums auf. Er sagt (l. c. p. 224): „Daraus, daß sich der Gallertteil (der Volva) als erster Beginn einer Huttrama erweist, wäre zu erwarten, daß auch er ursprünglich von einer Palisade überkleidet ist. Das aber ... ist nach Möllers Ausführungen nicht der Fall. Trotzdem behaupte ich, ohne Möllers gewissenhaften Arbeiten nahezutreten, muß ursprünglich wenigstens auf der Außenseite eine Palisade vorhanden gewesen sein. Denn die Peridie ist doch im fertigen Zustande pseudoparenchymatisch, während die primäre Peridie als Fortsetzung der Rindenschicht des Myzelstranges aus locker und wirr verflochtenen Hyphen besteht. Dieses peridiale Pseudoparenchym ist ... von hymenialer Herkunft. Es wäre sehr interessant, die Peridie von *Protubera* nochmals einer sorgfältigen mikroskopischen Untersuchung zu unterziehen, ob das Pseudoparenchym als geschlossene Schicht den ganzen Pilz umgibt oder ob es, wie bei *Phallogaster,* nur genau über den Hüten entwickelt ist und entsprechend den die Volvagallert durchsetzenden Wänden ... von nicht pseudoparenchymatischen Partien durchsetzt wird.“ Zwecks Feststellung dieser Verhältnisse führte ich eine Anzahl Schnitte an jungen wie an älteren Fruchtkörpern aus. Letztere ergaben, daß das von Möller bei seinen Exemplaren als Pseudoparenchym bezeichnete Geflecht in den unsrigen aus weitlumigen gebräunten Hyphen besteht, die im ältesten Fruchtkörper stellenweise blasige Anschwellungen zeigen, also eigentlich nicht ein so ganz typisches Pseudoparenchym darstellt. Dieses so beschaffene Geflecht umgibt nun den ganzen Fruchtkörper als kontinuierliche Schicht, und auch an den Stellen, wo die Zwischengeflechtspartien aus der Volva austreten, zeigt sie keinerlei Unterbrechung, sondern setzt sich ganz gleichartig fort und geht hier nach innen ganz allmählich in jenes Zwischengeflecht über. — Spricht das schon gegen eine Deutung dieser „Pseudoparenchymschicht“ als Hymenialpseudoparenchym, so ergibt es sich noch klarer aus den ganz jugendlichen Stadien. In einem Schnitt, der ziemlich genau der Möllerschen Fig. 5 auf Tafel VI entspricht, konnte ich — ganz entsprechend der Darstellung, die in diesem Bild gegeben ist — feststellen, daß die Palisadenschicht, welche die höckerförmigen Tramaplattenanlagen überzieht, sich nicht auf die Außenseite der „Hüte“ fortsetzt,

[2]) H. Lohwag, Zur Entwicklungsgeschichte und Morphologie der Gastromyceten. Beihefte zum Botan. Centralblatt XLII (1926), Abt. II, p. 177—334.

sondern sich innerhalb ihres Endes auskeilt. — Es ist also bei *Protubera maracuja* kein peridiales Pseudoparenchym von hymenialer Herkunft (Hymenialperidie) vorhanden.

Nach Fitzpatricks[3]) Auffassung würde dieses Verhalten mit dem von *Phallogaster* übereinstimmen, für welchen dieser Autor in bezug auf die pseudoparenchymatische Peridie folgendes sagt (p. 127): „The peridium, which in the earliest stages differed in no respect from the cortex of the rhizomorph, has gradually undergone change and at this time has assumed the pseudoparenchymatous structure characteristic of the mature condition. The cells of the threads have become more nearly isodiametric and the tissue considerably more compact.“ Aber Lohwag (l. c. p. 258) faßt die Sache anders auf wenn er sagt: „Hier bei *Phallogaster* wird später die Peridie pseudoparenchymatisch, und zwar genau oberhalb der ... verbreiterten Fruchtkörperenden .... Die ursprünglich tatsächlich vorhandene Endpalisade ist in die Peridie ausgewachsen und hat diese in der bekannten Weise verändert. Dadurch wird die Peridie an diesen Stellen dicker und fester, während sie dazwischen aus dem unveränderten Geflecht der primären Peridie besteht: das sind die auffälligen vertieften Stellen in ihr.“ Ich war in meinen Phalloideenuntersuchungen vom Jahre 1900[4]) noch weiter gegangen und hatte das Rindengeflecht direkt als Homologon des Hymeniums angesehen. Aber es lagen mir damals nur ältere Jugendstadien vor, so daß ich die Beteiligung der primären Peridie nicht in Rechnung zog.

Sclerodermataceen

Pirogaster (?) Stahelii nov. spec. — Calebas Creek am unteren Coppename-Fluß. Juni 1920.

Fruchtkörper breit birnförmig, oben abgeplattet, nach der Basis in einen sehr kurzen Stiel verjüngt, von dem das Myzel abgeht. Durchmesser ca. 2½ cm, Höhe zwischen 2½ und 3 cm. Oberfläche bräunlichgelb, kleinfelderig warzig. — Die Peridie ist in den mittleren und oberen Teilen des Fruchtkörpers etwas ungleichmäßig dick, stellenweise erreicht sie 1½ mm. Dünner ist sie speziell auch am Scheitel. Sie läßt drei verschiedene Schichten unterscheiden: 1. eine äußerste besteht aus bald deutlicher, bald weniger ausgesprochen senkrecht abstehenden Hyphen, die partienweise näher zusammentreten und dadurch die Warzen der Fruchtkörperoberfläche bilden, 2. eine Schicht aus ganz dicht, lückenlos verflochtenen weitlumigen, ca. 7—10 μ dicken Hyphen, deren Membran ein wenig, aber nicht stark verdickt ist; 3. die innerste Schicht endlich besteht aus sehr locker ver-

[3]) H. M. Fitzpatrick, A comparative study of the development of the fruit body in *Phallogaster, Hysterangium* and *Gautieria*. Annales Mycologici XI (1913), p. 119—149.

[4]) Ed. Fischer, Untersuchungen zur vergleichenden Entwicklungsgeschichte und Systematik der Phalloideen III. Serie. Denkschriften der schweizerischen naturforschenden Gesellschaft 36 II 1900.

flochtenen, ca. 3—4 μ dicken Hyphen, welche Schnallenbildungen erkennen lassen. — Am Grunde des Fruchtkörpers ist die zweite Schicht kurz vorgezogen und bildet so den Stiel. Hier ist aber auch die innerste Schicht stärker entwickelt und erscheint gekammert. — Die Gleba besteht aus einer braunschwarzen Masse reifer Sporen, die von einem Netzwerk ziemlich kompakter heller Adern durchsetzt ist. Die Sporen lagern besonders diesen Netzadern an und füllen die Maschen nicht ganz bis zur Mitte aus. Man könnte daher geneigt sein zu denken, daß es sich um Kammern handelt, deren Wandung von einem Basidienhymenium überzogen war; aber da Basidien nicht mehr erhalten sind, läßt sich das nicht entscheiden. — Die Sporen sind kugelig, braungefärbt, äußerst kleinwarzig. Ihr Durchmesser beträgt 5—7 μ. Von Capillitiumbildungen konnte ich nichts wahrnehmen. Es muß dahingestellt bleiben, ob die sterilen Adern zuletzt desorganisiert werden. Ebenso wissen wir auch nicht, wie das Öffnen erfolgt. (Es standen nämlich nur zwei noch geschlossene Fruchtkörper zur Verfügung.)

Unter obwaltenden Verhältnissen bleiben über die systematische Stellung dieses Pilzes noch Zweifel übrig. Aber doch spricht der ganze Habitus, der Peridienbau, die von netzigem, länger als die Basidien erhalten bleibendem Aderwerk durchsetzte Gleba, sowie das offenbare Fehlen eines typischen Capillitiums dafür, daß es sich um eine Sclerodermatacee handelt. Und unter diesen besteht am meisten Ähnlichkeit mit *Pompholyx*[5]) und *Pirogaster*[6]). Bei ersterem finden wir aber viel größere (Durchmesser 12,5 μ), mit einem großen, farblosen Hilum versehene Sporen. *Pirogaster* hat ebenfalls größere Sporen (14—16 μ) und diese sind mit kräftigen konischen Stacheln versehen; ferner dürfte die Peridie nicht die deutliche lockere Innenschicht besitzen, die unserm Pilz eigen ist. Endlich ist die Gesamtform des Fruchtkörpers von *Pirogaster* schlanker; der Stiel ist dünner, länger und deutlicher abgesetzt, aber er bildet hier wie dort die direkte Fortsetzung der Peridie. — Als näher verwandte Gattungen sind auch *Caloderma* L. Petri[7]) (Syn. *Neo-Saccardia* Mattirolo[8])) und *Holocotylon* Lloyd zu nennen. Ersteres hat aber eine auffällig dichtstachelige Peridie und zeigt im Glebabau die Eigentümlichkeit, daß Auszweigungen der sterilen Adern in die Sporennester hineinragen. *Holocotylon,* bei dem nach Lloyds[9]) Beschreibung die Gleba ebenfalls lange von sterilen Adern durchsetzt ist, an welchen die Sporen ansitzen, unterscheidet sich durch eine sehr dünne Peridie. — Nach dem Gesagten dürfte

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[5]) Vgl. A. de Jaczewski, Note sur le *Pompholyx sapidum* Corda. Bull. Soc. Mycologique de France 9 (1893), p. 169 ff.

[6]) P. Hennings in Hedwigia XL (1901), p. 27.

[7]) L. Petri in Malpighia 14 (1900), p. 132.

[8]) O. Mattirolo in Atti della R. Accademia della Scienze di Torino 56 (1920), p. 27—33.

[9]) C. G. Lloyd in Mycological Notes no. 21 (1906), p. 254.

also der vorliegende Pilz *Pirogaster* am nächsten stehen, doch stelle ich ihn nur mit einem Fragezeichen zu dieser Gattung. In der Diagnose von *Pirogaster* in Engler-Prantl, Natürliche Pflanzenfamilien Ed. II Bd. 7a, p. 39 habe ich ihn nicht mitberücksichtigt.

Lycogalopsis Solmsii Ed. Fischer in Berichte der Deutschen Botanischen Gesellschaft 4 (1886), p. 192—197. Auf totem Holz. Mambabasoe am Saramaccafluß. 28. März 1922, leg. G. Stahel.

Der Pilz lag in verschiedenen Entwicklungszuständen vor. Die jüngsten sind dünne, rundliche Myzelhäute, die in der Mitte warzenförmig anschwellen. Aus diesen Anschwellungen gehen schließlich die *Lycogala*-ähnlichen Fruchtkörper hervor. Sie sind rundlich, meist ziemlich auffallend abgeplattet; ihr Durchmesser erreicht 8 mm, bei einem etwas länglichen in der Längsrichtung 1 cm. Auf Schnitten konnte festgestellt werden, daß die Fruchtkörper auf einem Stroma von konzentrisch schaligem Bau stehen; oft sitzen sie schräg auf. In nahezu reifem Zustande ist der Fruchtkörper breiter als das Stroma, so daß letzteres von außen wie ein kurzer, dicker Stiel aussieht, der auch in der Farbe von der Peridie abweicht. Letztere ist nämlich (im Alkoholmaterial) graulich-weiß, das Stroma dagegen mehr braun. Die Peridie ist glatt und zerfällt schließlich lappig, mitunter fast sternförmig. An einigen Fruchtkörpern bemerkte ich auf ihr rostfarbige, wie mir schien mehr oder weniger deutlich meridional verlaufende, öfters anastomosierende Linien. Mikroskopisch betrachtet präsentierten sie sich als Rinnen, in deren Umgebung die Hyphen gelb verfärbt erscheinen. Ich bin geneigt anzunehmen, es handle sich hier nicht um eine Eigentümlichkeit des Pilzes selber, sondern es sei dies dadurch entstanden, daß während der Entwicklung des Fruchtkörpers ein verwesendes Blatt auflag, dessen Nervatur sich auf ihm abdrückte. Sieht man hiervon und von den etwas größeren Dimensionen, sowie der vielleicht im allgemeinen etwas mehr abgeplatteten Gestalt der Fruchtkörper ab, so stimmt vorliegender Pilz so sehr mit *Lycogalopsis Solmsii* überein, daß ich an der Identität mit diesem nicht zweifle: der Bau der Gleba, das rudimentäre Capillitium (vom Zerfall der Kammerwände übrigbleibende Bündel farbloser Hyphen), die kugelige bis längliche Form und die Größe (3—4 μ) der mit Wärzchen besetzten Sporen sind die nämlichen wie bei *L. Solmsii* und bilden Unterschiede gegenüber den anderen bisher beschriebenen Arten (vgl. Engler-Prantl, Natürl. Pflanzenfamilien Ed. 2 Bd. 7a, p. 42). Wir haben somit hier wieder einen Fall vor uns, in welchem ein bisher nur aus den Tropen der alten Welt bekannter Pilz auch für Südamerika nachgewiesen wird.

Tremellogaster surinamensis Ed. Fischer in Mitteilungen der Naturforschenden Gesellschaft in Bern aus dem Jahre 1923 (Bern 1924), p. 49—56. — Mambabasoe am Saramaccafluß auf sandigem Boden neben einem toten Baumstamm, 28. März 1922, leg. Gonggrijp.

Unsere Beschreibung l. c. beruhte auf reifen Fruchtkörpern, in welchen der Glebabau nicht mehr sicher erkennbar war. In Frage kamen Lycoperdaceen und Plectobasidieen (Sclerodermineen). Nun hat seither David B. Linder[10]) den Pilz in Britisch Guyana wiedergefunden und jüngere Fruchtkörper desselben untersuchen können. Er stellte fest, daß die Gleba basidienführende Nester aufweist, in denen die Basidien zu Hymenien vereinigt sind. Ferner findet er ein Pseudocapillitium in Form von farblosen, kurzverzweigten, mit spärlichen Warzen besetzten Hyphen. Gestützt auf seine Untersuchung ist er geneigt, *Tremellogaster* eher zu den Sclerodermataceen als zu den Lycoperdaceen zu stellen. Immerhin ist die Zugehörigkeit zu dieser Familie namentlich wegen der eigenartigen Peridienausbildung noch nicht als endgültig sicher anzusehen.

Nidulariaceen

Cyathus Montagnei Tul. in Annales des Sciences nat. Sér. 3 T. 1 1844, p. 70. — Mambabasoe am Saramaccafluß, 28. Febr. 1922.

Der vorliegende Pilz gleicht in seinem Habitus sehr dem *Cyathus striatus*, und die Sporenmaße sind im wesentlichen übereinstimmend: sie betragen 14—18 ≈ ca. 10 μ. Hingegen besteht dieser Art gegenüber ein Unterschied darin, daß die Zotten der Außenseite spärlicher und länger sind als dort (bei *C. striatus* sind sie krauser und kürzer). Ferner dürften die Falten der Becherinnenseite seichter und undeutlicher sein, die Corona vielleicht etwas stärker ausgebildet. Ich stelle den Pilz namentlich wegen der Beschaffenheit der Außenseite vorläufig zu *C. Montagnei*. Tulasne (l. c.) gibt nämlich von diesem an, er sei „parce[11]) lanuginoso hirtus" und fügt bei „Peridium structura illum *C. striati* aemulatur, extus vero minus hirsutum". Die Innenseite geben die Autoren für *C. Montagnei* allerdings nur als „striata" und nicht als „sulcata" an; doch wird für die var. *brasiliensis* Speg. nach Saccardo Sylloge gesagt: margine grosse plicato-sulcata. Aus Mangel an Vergleichsmaterial bleibt unsere Bestimmung aber doch noch etwas unsicher.

Geastraceen

Geastrum[12]) *Hariotii* Lloyd Mycological Notes no. 25 (1907), p. 311. Urwald bei Paramaribo bei Charlesburg. Dez. 1924.

Exoperidie in 8 Lappen gespalten, die mit ihren Spitzen nach unten geschlagen und außen mit Erdpartikeln besetzt sind. Die Länge der freien

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[10]) David B. Linder, Notes on *Tremellogaster surinamensis*. Mycologia 22 (1930), p. 265—270.

[11]) Von uns gesperrt.

[12]) Wir schreiben (wie in Engler-Prantl, Natürliche Pflanzenfamilien Ed. 2 Bd. 7a 1933) *Geastrum* statt *Geaster*, weil Persoon (Synopsis methodica fungorum 1801), der nach den Internat. Nomenklaturregeln den Ausgangspunkt für die Benennung der Gastromyceten darstellt, das Neutrum braucht.

Lappen beträgt 17—20 mm, der Abstand der Einschnitte von der Ansatzstelle der Innenperidie ca. 1 cm. Die Pseudoparenchymschicht ist am ungeteilten Grunde quer zerspalten, an den freien Lappen z. T. durch Furchen längsgeteilt. Die Innenperidie war im frischen Zustande wohl rundlich, im Alkohol ist sie etwas eingefallen; sie ist kaum gestielt, aber nicht in einem becherähnlichen Grunde der Außenperidie eingesenkt; ihre Farbe ist dunkelbraun, die Oberfläche fein gekörnelt, das Ostiolum stark konisch vorgezogen, faltig gefurcht und deutlich umrandet. Die Sporen haben 3—4 μ Durchmesser und sind kleinwarzig.

Es stimmt dieser Pilz am besten überein mit *G. Harioti* nach den Beschreibungen von Lloyd (l. c.), Cunningham[13]) und Coker and Couch[14]). Von den ähnlichen Species *G. asperum, pseudostriatum* und *Berkeleyi* unterscheidet er sich durch kleinere Sporen und die nicht gestielte Endoperidie. Es handelt sich um eine in Südamerika verbreitete Art, die auch bereits aus Holländisch Guyana bekannt ist. Sie kommt ebenfalls in Australien vor. In Europa wird ihr Vorkommen in Spanien erwähnt (Cunningham l. c.).

Geastrum cf. Morganii Lloyd. Mycological Notes no. 8 (1901), p. 80. — Urwald bei Paramaribo bei Charlesburg. Dez. 1924.

Junge Fruchtkörper mit gelbbrauner, fast glatter Oberfläche, ohne anhaftende Erdpartikel, kugelig mit stark vorgezogener Scheitelpapille. Im Längsschnitt erkennt man unter der letzteren ein ebenfalls stark vorgezogenes Ostiolum der Innenperidie.

Eine sichere Bestimmung ist, da kein offener Fruchtkörper vorliegt, nicht möglich. Als Arten mit vorgezogenem Scheitel sind besonders *G. triplex, lageniforme* und *Morganii* beschrieben, die Cunningham l. c. als synonym ansieht, während Lloyd (l. c.) sowie Coker und Couch (l. c.) sie trennen.

Geastrum setosum nov. spec. — Urwald bei Paramaribo bei Charlesburg. Dez. 1924. — Expedition nach dem Hendrikstop. Kamp 15½ km (zwischen Toekoemoetoe und Hendrikstop) auf Ameisennest. 3. März 1922, leg. G. Stahel.

Es handelt sich hier um ein schon in den Jugendstadien oberirdisches *Geastrum*, dessen Fruchtkörper aber nicht — wie bei der *mirabile*-Gruppe — auf einem häutigen Myzelüberzug auftreten, sondern einem unregelmäßig verästelten Myzelstrang ansitzen. Besonders charakteristisch ist der Umstand, daß diese Fruchtkörper mit ziemlich dichtstehenden, bis ca. 3 mm

[13]) G. H. Cunningham, The Gasteromycetes of Australasia IV Species of the genus Geaster. Proceed. Linnean Society of New South Wales 51 (1926), p. 72—94.

[14]) W. Ch. Coker and J. N. Couch, The Gasteromycetes of the Eastern United States and Canada. Chapel Hill 1928, p. 135.

langen Borsten besetzt sind und so im ungeöffneten Zustand an *Lycoperdon echinatum* erinnern. Ich untersuchte deren Bau hauptsächlich an den Exemplaren von Charlesburg, deren Durchmesser bis zu 2 cm erreicht. Die Borsten bestehen aus parallel verlaufenden, dicht verbundenen Hyphen, die ich bei einem der Exemplare von der Hendrikstop-Expedition z. T. durch eine homogene Substanz verklebt fand. Sie gehen von einer Oberflächenschicht ab, deren Hyphen außen wirr, innen parallel zur Oberfläche verlaufen und die sich leicht von der darunterliegenden Faserschicht ablösen. Diese war daher in einzelnen Exemplaren stellenweise entblößt und zeigte speziell an einem kleineren Fruchtkörper eine faltiggrubige Oberfläche. Am Scheitel dürfte sie unvollkommen ausgebildet oder gelockert sein. Sehr entwickelt ist die Pseudoparenchymschicht: ihr Durchmesser beträgt an der Basis des Fruchtkörpers bis etwa 1 mm; oben ist sie nicht papillen-

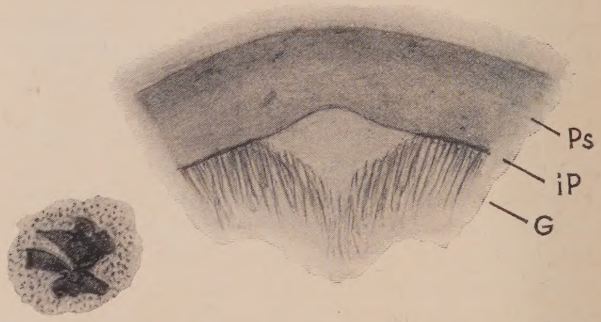

Fig. 1. *Geastrum setosum:* Rechts: Längsschnitt aus der Scheitelpartie eines noch geschlossenen Fruchtkörpers: *Ps* Pseudoparenchymschicht, *iP* Innenperidie. G. Gleba. Links: Ostiolum der Innenperidie eines geöffneten Fruchtkörpers von oben (vergrößert).

artig vorgewölbt und zeigt an ihrer Innenseite nur eine leichte Einbuchtung (s. Figur 1). Unterhalb dieser Einbuchtung verbreitert und lockert sich die Innenperidie zu einer linsenförmigen Partie, in welcher die Faserhyphen dünnwandiger sowie regellos und lockerer verflochten sind und mit zahlreichen dünnwandigen Hyphen untermischt erscheinen. Dadurch wird das unten zu beschreibende Ostiolum vorgebildet, indem diese Scheitelpartie offenbar desorganisiert wird. Die in diesem Stadium noch unreife Gleba läßt erst farblose Capillitiumfasern und junge Sporen erkennen. Die Columella ist schlank keulenförmig.

Bei den Jugendexemplaren von der Hendrikstop-Expedition befinden sich auch erwachsene Exemplare, eines derselben hart neben einem der ersteren, anscheinend in Myzelzusammenhang, wodurch die Zusammengehörigkeit unzweifelhaft erscheint. Die Lappen der Exoperidie dieser offenen Fruchtkörper sind zurückgeschlagen, in einem Falle erkennt man deutlich, daß die Innenschichten (Faser- und Pseudoparenchymschicht) sich von einem Außenbecher getrennt haben. Die Innenperidie ist rundlich,

sitzend, aber mit der Basis nicht in der Exoperidie eingesenkt. Sie ist undeutlich feinkörnig bis kleinwarzig. Die Mündung (in Fig. 1 links) ist rissig lappig (nicht faserig gefranst) und nicht konisch vorgezogen. Die Sporen haben einen Durchmesser von $3^1/_2$—4 μ und sind sehr kleinwarzig.

Unter den bisher bekannten *Geastrum*-Arten befindet sich unseres Wissens, wenn man von *G. mirabile* absieht (s. unten), nur eine, die die oben beschriebene charakteristische Oberflächenbeschaffenheit besitzt. Es ist dies *G. trichiferum* Rick aus Brasilien. Die erste Erwähnung desselben findet sich bei Lloyd (in dessen Mycological Notes 25 (1907), p. 214), der eine Photographie bringt mit der Bemerkung, Rick benenne brieflich den Pilz mit obigem Namen; eine nähere Beschreibung wird aber hier nicht gegeben. Dagegen bringen Coker und Couch (l. c. p. 118) eine solche nach Exemplaren von Murrill aus Jamaica. Legt man diese zugrunde, so unterscheidet sich *G. trichiferum* von vorliegender Form durch die in die äußere Peridie eingesenkte Basis der Innenperidie und durch Besitz eines deutlichen Peristoms, das fransig (fimbriatum) wird. Ferner ist der von Lloyd abgebildete Fruchtkörper viel kleiner als bei dem unsrigen. Daher läßt sich letzterer nicht mit *G. trichiferum* identifizieren, wir betrachten ihn somit als eine besondere Art, die wir nach dem augenfälligsten Merkmal *Geastrum setosum* nennen.

Geastrum-Formen vom Typus des Geastrum mirabile Montagne. — Der von Montagne in Annales des sciences naturelles Sér. 4 T. 3 (1855), p. 139—140 unter dem Namen *Geaster mirabilis* beschriebene Pilz ist charakterisiert durch kleine, einem häutigen Myzel aufsitzende Fruchtkörper. Seit Montagne sind aber noch verschiedene Arten von diesem Typus beschrieben worden, so *Geaster subiculosus* Cooke et Massee in Grevillea 1887, p. 97, *G. papyraceus* Berk. et Curt. in Proceed. Americ. Acad. of sciences 4 (1860), p. 124, *G. caespitosus* Lloyd, Mycol. Notes no. 25 (1907), p. 315, *G. lignicola* Berk. in Journ. Linn. Society. Botany 18 (1881), p. 386. Diese werden von den neueren Autoren (Lloyd, Cunningham, Coker and Couch) bald mit *Geastrum mirabile* identifiziert, bald zu anderen Arten gestellt (so *G. caespitosum* von Lloyd zu *G. velutinum*), bald als selbständig betrachtet. In der Sammlung, die wir von Herrn Prof. Stahel erhalten haben, befinden sich zwei hierher gehörige Formen, die sicher voneinander verschieden sind.

a) Exemplare von Mambabasoe am Saramaccafluß. 28. März 1922, leg. G. Stahel. — Das Myzel bildet eine dünne, weißliche Haut, welche Holzstücke überzieht, aus der sich aber auch Stränge herausheben. Auf derselben sitzen die (im Alkohol) weißlich gefärbten Fruchtkörper, die jüngsten als halbkugelige Warzen, ältere birnförmig kopfig, der älteste fast kugelig, kurzgestielt. Der Durchmesser des letzteren beträgt 7—8 mm. Bei den jüngsten erscheint die Oberfläche warzig, später werden diese Warzen länger, sind mehr auseinandergerückt und nach unten gerichtet. —

Ganz reife offene Fruchtkörper befanden sich unter diesem Material nicht, aber der Längsschnitt der ältesten Jugendstadien ließ typische *Geastrum*-Verhältnisse erkennen, ferner stimmt die Größe und Form, sowie die warzige Oberfläche so gut mit der Beschreibung und Abbildung, die Montagne von *G. mirabile* gibt, daß kaum an der Zugehörigkeit zu dieser Art gezweifelt werden kann. Da genannter Autor keine Details über den Bau dieses Pilzes gibt, so lassen wir hier einige Angaben folgen: Bei dem ältesten unserer Fruchtkörper besteht die Oberflächenschicht aus lockeren und gegen außen undeutlich parallel abgehenden Hyphen von ca. 4 μ Durchmesser. Letztere bilden die in diesem Stadium, wenigstens im Alkoholmaterial, nicht mehr stark abstehenden Warzen. Diese Oberflächenschicht löst sich sehr leicht von der darunter liegenden Faserschicht, welche ca. 75 μ dick ist und aus wirr und dicht verflochtenen, nicht ausschließlich parallel zur Oberfläche verlaufenden, äußerst dickwandigen Hyphen von ca. 7 μ (am Scheitel bis zu 10 μ) Durchmesser besteht. Zuoberst ist das Geflecht dieser Faserschicht vielleicht etwas gelockert. — Die Pseudoparenchymschicht hat in diesem Stadium von unten bis oben ungefähr die gleiche Dicke (etwa 375—450 μ); am Scheitel bildet sie einen kleinen Buckel. Unter ihren Zellen haben die isodiametrischen einen Durchmesser um 20—30 μ herum. Die innere Peridie ist sehr dünn (ca. 20 μ) und besteht aus dicht verflochtenen, dickwandigen gelblichen Hyphen, die meist der Oberfläche parallel verlaufen dürften. Unter der buckligen Scheitelvorwölbung der Pseudoparenchymschicht erhebt sie sich kegelförmig und löst sich anscheinend in scheitelwärts gerichtete Fasern auf. Man kann also schon in diesem Stadium erkennen, daß die innere Peridie ein stark konisch vorragendes Ostiolum besitzt, was wiederum Montagne's Beschreibung der reifen Exemplare entspricht. Die Capillitiumfasern sind kaum verzweigt, ca. 3 μ dick, braun.

b) Exemplare bei Kamp 7½ km während der Expedition nach dem Hendrikstop am 25. Febr. 1922 gesammelt von Prof. Stahel. — Hier liegen sowohl junge wie geöffnete Fruchtkörper vor. Sie stehen auf einem häutig-lederigen Myzel, das (im Alkohol) gelblich bis hellbräunlich gefärbt ist und etwas dicker erscheint als bei der oben beschriebenen Form. Einer der der Reife entgegengehenden Fruchtkörper, in welchem die Gleba am Grunde dunkel verfärbt war, hatte ca. 8 mm Durchmesser. Seine Gestalt war birnförmig, am Scheitel gebuckelt. Gegenüber dem oben beschriebenen typischen *G. mirabile* fällt die gelbliche Färbung auf und das Fehlen von Warzen oder Zotten: die Oberfläche ist glatt und kahl, höchstens etwas felderig-runzelig. (In einzelnen jüngeren Exemplaren ist sie stärker runzelig-warzig.) Bei den offenen Fruchtkörpern ist die äußere Peridie in etwa 5 Lappen aufgerissen; die innere Peridie ist in der sackartig vertieften Mitte der äußeren eingesenkt, sie ist glatt; das Ostiolum ragt papillenförmig, aber nicht sehr stark, vor, ist in einige Zähne gespalten und von einem scharf umschriebenen Hofe umgeben. Es liegt also hier eine vom typischen

G. mirabile etwas abweichende Form vor, aber ich wage nicht, sie mit einer der andern neben *G. mirabile* unterschiedenen Arten zu identifizieren. Die ganze *mirabile*-Gruppe bedarf einer erneuten Bearbeitung.

Geastrum cupulare nov. spec. Kamp 7½ km. Expedition nach dem Hendrikstop. 25. Febr. 1922, leg. G. Stahel.

Fruchtkörper wohl oberirdisch, von kleinen Dimensionen, einem basalen Myzelstrang ansitzend, mit kelchförmiger halbkugeliger Basis, deren Durchmesser bis ca. 1 cm erreicht, nach oben in 5–6 Lappen gespalten, die in den vorliegenden Exemplaren meist aufgerichtet, seltener mehr ausgebreitet sind. Dabei ist natürlich zu bemerken, daß es sich um noch nicht völlig geöffnete Exemplare handeln könnte. Exoperidie mit einer aus locker filzig verflochtenen Hyphen bestehenden, etwas unebenen Rinde, einer relativ schwach entwickelten Faserschicht und einer gut ausgebildeten Pseudoparenchymschicht bestehend. Endoperidie sitzend, ungestielt und dem becherförmigen Grunde der Exoperidie eingesenkt, mit undeutlich feingekörnelter Oberfläche. Ostiolum lappig rissig, ohne deutlich abgegrenzten Hof. Capillitiumfasern unverzweigt, bis 3½ μ dick. Sporen feinwarzig. Durchmesser 3½ μ.

Vergleicht man diesen Pilz mit anderen *Geastrum*-Arten, so findet man einen basalen Myzelstrang und Fruchtkörper von kleinen Dimensionen auch bei *G. trichiferum*, das aber eine ganz anders beschaffene Oberfläche hat (s. oben). Ferner kommen auch bei dem in den Tropen weit verbreiteten *Geastrum velutinum* Exemplare mit kleinen Fruchtkörpern vor; solche bildet Cunningham[15]) ab, ebenso auch Lloyd[16]) unter den Namen *G. caespitosum*. Indes unterscheidet sich *Geastrum velutinum* von vorliegender Form durch ein scharf abgegrenztes Ostiolum und die aus senkrecht abstehenden Hyphen bestehende Rinde. *Geastrum leptospermum* Coker et Couch hat ein flockiges Myzel. So ungern ich den bereits bestehenden Ballast von Namen in der Gattung *Geastrum* vermehre, muß ich daher auch hier vorläufig eine neue Art unterscheiden, die ich *G. cupulare* nenne.

Geasteropsis Stahelii nov. spec. — Toekoemoetoe, Expedition nach dem Hendrikstop. 23. März 1922.

Wir geben an anderer Stelle[17]) eine genauere Beschreibung dieses

[15]) Cunningham, G. H., The development of *Geaster velutinus*. Transact. of the British Mycological Society 12 part. 1 (1927), p. 12—20.

[16]) C. G. Lloyd, The Geastreae. Cincinnati Ohio 1902, p. 36 und Mycological Notes no. 24 (1906), p. 315. Coker and Couch l. c. stellen dagegen *G. caespitosum* zu *G. mirabile*.

[17]) Ed. Fischer, Zur Kenntnis der Fruchtkörperentwicklung der Geastraceen. Berichte der Schweizerischen Botanischen Gesellschaft 42 (1933) Heft 1, p. 13—22.

Pilzes und Darstellung seiner Fruchtkörperentwicklung und beschränken uns hier daher nur auf eine kurze Diagnose.

Fruchtkörper wahrscheinlich an Myzelsträngen entspringend, oft zu wenigen gebüschelt, gestielt, vor dem Öffnen keulenförmig bis birnförmig, bis zu 3 cm hoch und $1^1/_2$ cm im Durchmesser, am Scheitel oft fast unmerklich gebuckelt. Oberfläche glatt oder rissig gefeldert, lederbraun (im Alkohol). Äußere Peridie mit Rindenschicht und Pseudoparenchymschicht in der Reife unregelmäßig lappig geöffnet; innere Peridie am Scheitel mit rudimentärer Ostiolumanlage, bei der Reife gänzlich zerfallend. Columella als lange dünngestielte Keule erhalten bleibend. Sporen kugelig, mit Durchmesser von 3—4 μ. Sporenmembran sehr kleinwarzig.

Clathraceen und Phallaceen

Die eingehendere Bearbeitung der Vertreter der Phalloideen haben wir bereits früher publiziert, zuletzt in zusammenfassender Weise in dem Aufsatz: Untersuchungen über Phalloideen aus Surinam in der Festschrift Hans Schinz (Beiblatt no. 15 zur Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich LXXIII (1928), p. 1—39[18]). Wir lassen daher hier nur ein kurzes Verzeichnis folgen. Bei einigen hat die Gattungsabgrenzung und Nomenklatur in unserer Bearbeitung der Gastromyceteae in Engler u. Prantl, Natürliche Pflanzenfamilien Editio 2 Änderungen erfahren, die nun hier berücksichtigt sind. Die in genannter früherer Arbeit gebrauchten Namen sind in Klammer beigefügt.

Colonnaria columnata (Bosc) Ed. Fischer (*Clathrus columnatus* Bosc). — Kultuurtuin Paramaribo, auf Sand zwischen etwas Gras. Juni 1925.

Clathrella Stahelii Ed. Fischer in Annales Mycologici 25 (1927) p. 472. — Patrik Savanne am Fuß des Brownsberges, 14. Dez. 1924 und Mitte August 1925.

Lysurus surinamensis Ed. Fischer (*Anthurus surinamensis* Ed. Fischer in Annales Mycologici 25 (1927), p. 471). — Wilhelminagebirge bei ca. 350 m über Meer auf einem toten Baumstamm. — Wir stellen heute die früher von uns zu *Anthurus* gerechneten Arten mit kurzen aufrechten und außen bis auf eine schmale Rückenlinie glebabedeckten Armen wieder zu *Lysurus* (s. Engler-Prantl Editio 2 Bd. 7a, p. 91).

Aseroë arachnoidea Ed. Fischer var. *americana*. — Auf Plantage Beckhuizen bei Paramaribo, im Felde auf altem Schweinemist. April 1927.

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[18]) Kurze Diagnosen der neuen Arten wurden schon in Annales mycologici 25 (1927), p. 470—473 mitgeteilt.

Xylophallus xylogenus (Montagne) Ed. Fischer (*Mutinus xylogenus* Montagne). — Sectie O (65 km südlich von Paramaribo). — Expedition nach dem Hendrikstop 1922. — Reise nach dem Volzberg 1923.

Staheliomyces cinctus Ed. Fischer in Mitteil. Naturf. Gesellsch. in Bern aus dem Jahre 1920 (Bern 1921), p. XXXV. — Im Walde hinter dem Caraibendorfe Heidoti am Coppenamefluß, 12. Juni 1918. — Calebar Kreek am unteren Coppenamefluß, Juni 1920. — Sectie O (65 km südlich von Paramaribo) 1920. — Wald neben den Raleigh-Fällen am oberen Coppenamefluß, 21. Aug. 1920. — Jodensavanne am Surinamfluß, leg. Junker 1921. — Expedition nach dem Hendrikstop, Kamp 15½ km zwischen Toekoemoetoe und Hendrikstop, 22. März 1922. — Mambabasoe am Saramaccafluß auf der nämlichen Expedition, 27. März 1922. — Brownsberg, Juli 1924 und 30. Januar 1925.

Jansia granulata Ed. Fischer (*Mutinus granulatus* Ed. Fischer in Annales Mycologici 25 (1927), p. 472). — Mambabasoe am Saramaccafluß (Expedition nach dem Hendrikstop), auf oder an einem toten Stamm von *Ravenala guyanensis*, 27. April 1922.

Phallus paucinervis Ed. Fischer (*Ithyphallus paucinervis* Ed. Fischer in Annales Mycologici 25 (1927), p. 472. — Brownsberg (?), Januar 1925.

Dictyophora indusiata ([Ventenat] Pers.) Ed. Fischer. — Cultuurtuin Paramaribo, 8. Aug. 1925. — Brownsberg, Mitte Aug. 1925, leg. Zaandam.

Dictyophora Farlowii Ed. Fischer in Unters. z. vergl. Entwicklungsgeschichte u. Systematik der Phalloideen III (1900), p. 54 (vielleicht zu *D. duplicata* (Bosc) Ed. Fischer gehörig). — Brownsberg, 420 m über Meer, Raleighvallen am Voltzberg.

Bern, den 10. Februar 1933.

Zur Kenntnis der Manschette von Amanita.

Von Heinrich Lohwag, Wien.

(Mit 2 Abbildungen im Text.)

Seit langem wird die Manschette der Amaniten als Annulus superus, der Ring von *Psalliota* als Annulus inferus bezeichnet, womit ausgedrückt werden soll, daß erstere sehr hoch am Stiel sitzt, während der letztere ungefähr um die Mitte des Stieles befestigt ist. Dabei denkt man sich beide aus einem sogenannten Grundgeflecht (Atkinson, 1914) der Fruchtkörperanlage hervorgegangen, das beim Ring durch Hyphen vom Hutrande und vom Stiele her, bei der Manschette allein vom Stiele eine Verstärkung erfährt (s. Gäumann, 1926). Bei einer derartigen Entstehung wäre schwer zu verstehen, wieso sich die Manschette der Amaniten beim Aufschirmen des Hutes ziemlich leicht vom Stiel trennt und — entgegen der Wirkung der Schwerkraft — an den Lamellenschneiden haftend mit in die Höhe genommen wird. Bereits in mehreren Arbeiten (1926, 1 und 2, 1928) habe ich darauf hingewiesen, daß die Manschette des Fliegenpilzes ganz anderer Herkunft ist als der Ring des Champignons oder des Parasolpilzes. Aus vergleichend morphologischen Betrachtungen war ich zur Überzeugung gekommen, daß die Manschette von den Lamellen erzeugt wird. Auf Handschnitten habe ich dies bestätigt gefunden und (1926, 1, p. 201) erwähnt. Doch infolge ihrer Zartheit wird die Manschette beim Schneiden leicht von den Lamellen abgerissen, so daß sich solche Schnitte nicht für eine überzeugende Beweisführung eignen. Ich entschloß mich daher gelegentlich, ein Jugendstadium des Fliegenpilzes mit dem Mikrotom zu schneiden.

Beim jungen, knollenförmigen Fliegenpilz nimmt den weitaus größten Teil die basale Stielknolle ein, so daß ihr das Hütchen wie ein flacher Schild aufsitzt und sich durch die bereits zerklüftete Hutvolva gut unterscheidet. Im Medianschnitt erscheint der Stiel als ganz flacher Kegelstumpf. Diesem liegt ein Geflechtsmantel auf, welchem die Blätterschneiden aufliegen. Einen Schnitt normal zur Ebene der Blätter und zur Oberfläche des Stieles stellt Fig. 1 dar. Rechterseits liegt der Hut, links der Stiel. Am Hut unterscheidet man zu äußerst die lockere Hutvolva, ihr folgt eine dunkler gefärbte Zone, es ist die später verquellende Trennungsschicht, dann die Huttrama, aus welcher die Lamellen entspringen. Die schmalen Lamellenzwischenräume haben sich an mehreren Stellen zu größeren oder kleineren unregelmäßigen Lücken erweitert, welche durch die Fixierung und Überführung entstanden. Dementsprechend erklärt sich

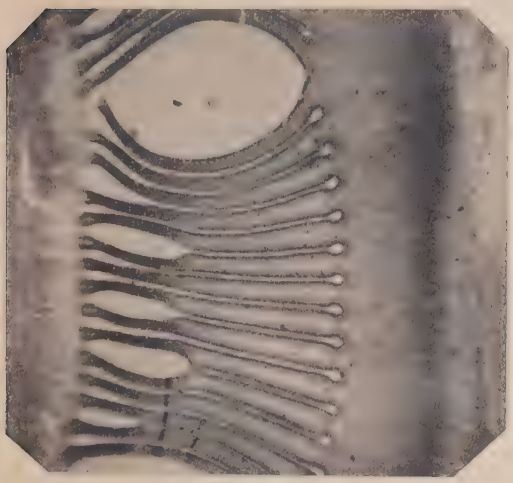

Fig. 1. *Amanita muscaria* (Fliegenpilz). Schnitt normal zur Ebene der Lamellenflächen und zur Stieloberfläche. Rechts die Volva, dann die dunkler gefärbte Verquellungszone, hierauf die Hutttrama, welcher die Lamellen entspringen, deren Schneiden in das zarte Manschettengeflecht übergehen. In der Mitte sieht man deutlich die den Lamellen entsprechenden Teile der Manschette. Links das Stielgeflecht. Die ± großen Lücken sind unnatürlich; ca. 17fache Lupenvergröß., aufgen. mit d. Cerny-Camera von Reichert, gefärbt mit Safranin-Pikrinsäure-Anilinblau, wobei sich dickere (Saft-)Hyphen der Trama dunkelrot färben.

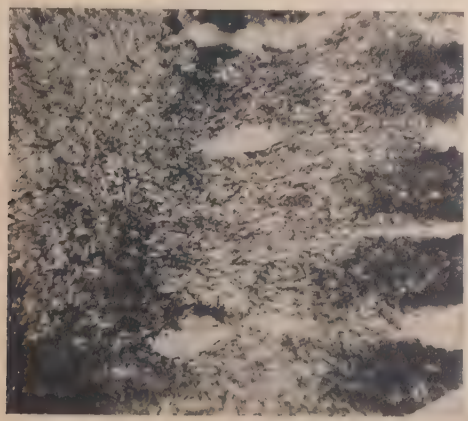

Fig. 2. Ein Stück der Manschette stärker vergrößert. Von rechts treten vier (dunkelgefärbte) Lamellen ein; diese gehen in das lockere Manschettengeflecht über, das entsprechend den Lamellen in Platten zerrissen ist. Nur zwischen den beiden mittleren Lamellen ist die Trennungsspalte in der Manschette sehr eng. Aufgen. mit Cerny-Camera; der Schnitt ist mit Safranin gefärbt.

die auffällige Verschmälerung der Dicke der Lamellen, soweit diese die kleineren Hohlräume begrenzen. Es handelt sich um Kontraktions- und Pressungserscheinungen. Wo diese nicht auftraten, ist die Dicke der Lamellen, sowie die Breite der Lamellenabstände von bewundernswerter Regelmäßigkeit. Dort, wo die Lamellen aus dem Hut entspringen, sind sie etwas schmäler, so daß sich der Lamellenzwischenraum dementsprechend erweitert. Alle Lamellen sind von einer dunkler gefärbten Linie gesäumt, welche sich bei stärkerer Vergrößerung als die Palisade zu erkennen gibt. Sie besteht — im Gegensatz zu den parallel zur Ebene der Lamellen verlaufenden Tramahyphen — aus normal zur Lamellenfläche stehenden keuligen Zellen und ist die Anlage des Hymeniums.

Die Schneide der Lamellen ist nicht scharf umgrenzt, sondern verschwimmt in der dem Stiel aufliegenden Manschette. Da uns in der vorliegenden Arbeit gerade die Verhältnisse in dieser Gegend interessieren, wird ein Teil der Fig. 1 stärker vergrößert in Fig. 2 zur Darstellung gebracht. Links liegt wieder der Stiel, rechts erscheinen die Blätter, deren dichtere und dunklere Palisadenschicht zu beiden Seiten der mehr lockeren Trama auffällt. Zwischen dem Stielgeflecht und dem Hymenial, worunter ich die Gesamtheit der Hymenophore, also hier der Lamellen verstehe, liegt ein lockeres Geflecht, welches eine Verbindungsbrücke herstellt. Es ist ganz klar zu sehen, daß die Hymenophore keine scharf begrenzten Enden (Schneiden) haben. Die Trama der Lamellen ist am Ende ausgewachsen, auch etwas hinter ihren Enden sind die Blätterzwischenräume von Hyphen erfüllt. Das Manschettengeflecht geht allmählich in das Stielgeflecht über, das sich durch seine Hyphendichte unterscheidet. Die Hyphen der Manschette verlaufen im Gegensatze zum wirrfaserigen Stielgeflecht ziemlich parallel in der Richtung vom Stiel zu den Lamellen. Das Manschettengeflecht ist deutlich gezerrt, wahrscheinlich infolge der Kontraktion der Lamellen.

Nun liegen 3 Erklärungsmöglichkeiten vor:

1. Die Manschette ist ein Teil des Grundgeflechts, aus welchem sich die Lamellen differenzieren. Dies ist die verbreitetste Anschauung.
2. Die Manschette ist der Hauptsache nach Stielgeflecht.
3. Die Manschette ist der Hauptsache nach aus den Lamellen hervorgegangen.

Die erste Ansicht ist aus folgenden Gründen abzulehnen: Die Lamellen sind Hymenophore. Diese entspringen bei allen Pilzen aus dem Fruchtkörper. Dies ist bei allen gymnocarpen Fruchtkörpern leicht festzustellen: Die Stoppeln, Röhren, Blätter sind in ihrer ersten Anlage Vorwölbungen der Hutunterseite. Aus welchem Grunde soll dies bei den Lamellen der Amaniten (oder den Hymenophoren vieler Gastromyceten) anders sein? Es spielt dabei keine Rolle, ob die Lamellen aus röhrigen Hymenophoren hervorgegangen sind, wie ich (1926, 1 und 2) ausgeführt habe, oder ob aus den Blättern röhrige Hymenophore hervorgehen, wie allgemein an-

genommen wird. Wenn bei den Amaniten und den Phalloideen die Verhältnisse anders zu liegen scheinen, so wird dies nur durch das Vorhandensein reichlicher Volvagebilde vorgetäuscht. Unter einer Volva verstehe ich nur jene Bildungen, die ihren Ursprung aus einem Fruchtkörperteil nehmen. Da die Fruchtkörper Fadengeflechte sind, treten aus allen Teilen mehr oder weniger reichlich Fäden hervor und bilden eine lockere Hülle. So besitzt die Hutoberseite, aber auch die Hutunterseite und der Stiel eine Volva. Die über den Hutrand hinausschießenden Hyphen sind ebenfalls hierher zu rechnen. Sie bilden bei genügender Reichlichkeit den Ring (Annulus inferus, s. z. B. *Psalliota, Lepiota,* die beringten Boleten); mithin ist der Ring eine Hutrandbildung.

Wenn die Hutunterseite, aber vor allem der Stiel eine reichlichere Volva haben, so muß der Raum zwischen Hut und Stiel von diesen beiden Volven erfüllt sein und die ersten Hymenophorvorwölbungen werden daher undeutlich in Erscheinung treten. Mit der fortschreitenden Verbreiterung der Lamellen bei gleichzeitigem Wachstumsstillstand der Volven werden diese Räume zwischen den Lamellen hyphenleer werden müssen, während die Schneiden weiterhin in das Stielvolvageflecht eintauchen. Aus vielen Fällen habe ich (1926, 1 und 2) folgende Entwicklungsleitsätze erkannt: Wenn Hymenophore gegen einen hyphenleeren oder -armen Raum grenzen, entsteht aus ihrer Palisade das Hymenium, wo sie aber gegen einen hyphenreichen Raum vorstoßen, wachsen ihre Hyphen aus und können sich mit dem entgegenstehenden Geflecht innig verflechten. Ein solcher Fall liegt bei Amanita vor. Erstens ist bei dem Vorhandensein einer mächtigen Hutvolva auch die reichliche Stielvolva verständlich, zweitens müssen bei der flachkegeligen Form des Stieles und bei dem ihm schildähnlich aufliegenden Hute die Hymenophore direkt in das Stielmantelgeflecht (Stielvolva) eintauchen und die Hyphen an den Schneiden auswachsen. Dies zeigt unsere Fig. 2 sehr deutlich. Doch könnte der Einwurf gemacht werden, daß nach dem Bilde auch die Annahme möglich wäre, daß die Manschette ein Gebilde der Stielvolvahyphen ist. Dagegen spricht aber eine auffällige Erscheinung: die Manschette zerfällt in unserem Bilde fast in ebenso viele Teile als Blätter vorhanden sind. Dies ist gewiß auch auf Kontraktionen und Schrumpfungen und damit verbundene Zerrungen zurückzuführen, und wird sonst nicht oder kaum vorhanden sein. In unserem Fall ist diese bei der Behandlung der Objekte eintretende, sonst unerfreuliche Erscheinung angenehm, da sie uns die Reichweite der Lamellenhyphen deutlich kundtut. Bei den 4 Lamellen, die im Schnitte getroffen sind, entspricht der Teil der Manschette, welcher der obersten Lamelle angehört, in seiner Breite gut der Lamellendicke. Von der untersten Lamelle ist der obere Zwischenraum (innerhalb der Manschette) gut, der gegen die nächst untere, im Bilde nicht mehr sichtbare Lamelle liegende nur als eine schwache Lücke in der Stielnähe zu erkennen. Durch diese beiden Lücken wird ein Streifen eingeschlossen, der

deutlich schwächer ist als die Lamelle selbst. Doch wenn wir die obere Lücke genauer betrachten, so sehen wir, daß sie nur nach unten stark ausgebuchtet ist und daher der Manschettenabschnitt um diese Breite zusammengedrängt (und dementsprechend dichter) ist. Natürlich ist das nicht so zu verstehen, wie wenn die Höhle (etwas Negatives) den betreffenden Manschettenabschnitt (etwas Körperliches) zusammendrängen könnte, sondern der letztere hat sich kontrahiert oder in der Höhle war längere Zeit eine Gasblase eingeschlossen, welche durch ihre Ausdehnung diese Erscheinung bewirkt oder verstärkt hat. Was die beiden mittleren Lamellen anlangt, so liegen sie knapper beisammen, daher auch ihr Zwischenraum nur mehr schwer zu sehen ist. Doch ist er mit Unterbrechung bis tief hinein zu verfolgen. Er teilt das Manschettenstück nicht in zwei gleichdicke Teile, sondern der obere ist etwas stärker, was nicht ins Gewicht fällt. Diese plattige Zerlegung der Manschette könnte nie erfolgen, wenn die Manschette Stielvolvageflecht wäre. Soweit diese Zerlegung eintritt, ist die Manschette zum größten Teil aus den Lamellen hervorgegangen, und nur das knapp an den Stiel angrenzende Stück ist aus einer Verflechtung von Stiel- und Lamellenhyphen entstanden.

Mithin ist die Manschette der Hauptsache nach eine Lamellenbildung. Die weitere Umwandlung besteht in einem starken Aufschwellen der Zellen der Manschette. Beim Aufschirmen des Hutes trennt sich gewöhnlich die Manschette zuerst vom Stiel, dann von den Schneiden, zuletzt vom Ende der Lamellen am Hutrande. Manchmal ist jedoch die Verknüpfung mit dem Stiele so innig, daß die Manschette nicht weit loskommt. Dies konnte ich beim Kaiserling (*Amanita caesarea*) mehrere Male beobachten. Es wird diese Erscheinung aus den früheren Erläuterungen verständlich: Da ursprünglich eine Stielvolva vorhanden war, und diese das Auswachsen der Tramahyphen mit veranlaßte, so hat eine Verflechtung stattgefunden. Diese Partie kann nur sehr dünn sein, da die Stielvolva keine weitere Entwicklung gegenüber der bedeutenden Vergrößerung der Lamellen erfährt. Darum wurde oben ausdrücklich betont, daß die Manschette der Hauptsache nach ein Gebilde der Lamellen sei.

Aus der Entstehungsweise der Manschette ist ohne weiteres klar, wieso diese „gerieft" sein muß. Da es sich um Lamellenschneiden handelt, muß deren Abreißen längsverlaufende Trennungslinien zurücklassen. Dabei entsprechen die vertieften Rillen der Manschette den Linien, an denen die Lamellen befestigt waren.

Noch eine Erscheinung ist zu erläutern. Die Manschette sitzt nicht ganz an der Spitze des Stieles, wie man zunächst aus der Entstehung erwarten sollte, sondern erst etwas unterhalb. Dies ist so zu erklären, daß die Lamellen in der Fruchtkörperanlage in der Gegend des Stielansatzes schmäler werden und sich auf diese Weise vom Stiele entfernen, so daß in diesem obersten Winkelchen keine Manschettenbildung zustande kommt. Bei der ganz ungeheuren Streckung, welche der Stiel während des Auf-

schirmens erfährt, wird dieser schmale Teil zu dem immerhin bemerkenswerten Stielspitzenteil, von dem bei den einzelnen Arten noch zu unterscheiden wäre, wie weit hinauf er noch Manschettenelemente birgt. Denn wie stark zarte, mit der Stielvolva verknüpfte Geflechte durch die enorme Streckung des Stieles zerrissen werden können, sieht man bei *Amanitopsis vaginata*, die im reifen Zustande im Gegensatze zu *Amanita* keine Manschette besitzt. Nach Atkinsons (1914) Untersuchungen junger Fruchtkörper, nach denen die Hyphen der Trama mit dem „Grundgeflecht", welches den Stiel einschließt, in ununterbrochener Verbindung stehen, ist zweifellos eine Manschette angelegt, die beim Aufschirmen zerreißt.

Ähnlich ist es bei manchen *Coprinus*-Arten. Besonders gut konnte ich dies bei *Coprinus narcoticus* beobachten, dessen Manschette ebenfalls nur im geschlossenen Zustand zu erkennen ist.

Wettstein (1887) hat bei *Coprinus* das Aufschwellen der Hymenialelemente an den Lamellenschneiden beobachtet, wodurch ein den Stiel scheidenförmig umschließendes Pseudoparenchym entsteht.

Auf Grund ihrer Bildungsweise muß die Manschette in Fällen, wo sie sich leicht vom Stiel löst und lange an den Schneiden haften bleibt, in folge der starken Hutvergrößerung in viele Fetzen zerrissen werden. Bei *Amanita ovoidea* ist sie sehr dick und locker und fällt beim Aufschirmen in großen Brocken herab.

Aus der Bildungsweise der Manschette ist endlich auch klar, daß die Schneiden der Blätter „flockig" sind, d. h. sie sind mit unregelmäßigen Gruppen aufgeblasener Zellelemente, welche die Manschette zusammensetzen, besetzt. Ganz ähnliche Verhältnisse finden sich nun bei *Phallus impudicus*, durch dessen Vergleich mit *Amanita* ich erst zu der Überzeugung gekommen bin, daß die Manschette ein Lamellengebilde sein müsse.

Das entfaltete Stadium von *Phallus* zeigt zunächst wenig Ähnlichkeit mit einem Fruchtkörper von *Amanita*. Es ist ein Stiel vorhanden, von dessen Spitze ein Hütchen herabhängt, der auf seiner Außenseite die schleimige grüne Glebamasse trägt. Da die Gleba das verquollene Hymenial darstellt, so hätten wir hier den im Pilzreich einzig dastehenden Fall, daß ein dünner, glockiger Hut auf seiner Unterseite steril, auf seiner Oberseite fertil ist.

Wenn wir nun ein reifes Eistadium von *Phallus* im Medianschnitt betrachten, so fällt zunächst die den ganzen Pilz einhüllende Eihaut auf. Eine solche fehlt bei *Amanita*. Zentral liegt der säulige Stiel, der außen von dem erwähnten Hütchen eingehüllt wird, diesem schließt sich die Gleba an, welche nach außen von einer dünnen Glocke begrenzt wird. Letztere ist nun der eigentliche Hut, woran auch seine Schmächtigkeit nichts ändert. Denn erstens ist er in den jüngsten Stadien recht kräftig und zweitens sehen wir bei sehr vielen Gastromyceten, daß der Hut und oft auch der Stiel mit der Reifung außerordentlich an Masse abnehmen.

Der im entfalteten Zustand hauchdünne Hut ist jene zarte Haut, von welcher die Gleba nach außen überzogen ist (Lohwag, 1928) und welche zunächst das Abfließen der Gleba verhindert. Im Eistadium sehen wir den Glockenhut nach außen von einer Gallertsubstanz bedeckt, die bei der Entfaltung des Pilzes infolge ihrer festen Verknüpfung mit der Eihaut im Ei sitzen bleibt. Diese Gallertschicht heißt seit jeher Volvagallerte, da man sie für einen Bestandteil der Eihaut hielt und diese als Volva bezeichnete, während sie in meiner Terminologie (1926) primäre Peridie heißt. Die Volvagallerte gehört aber ihrer Entstehungsweise und ihrem Hyphenverlaufe nach der Hutsubstanz an und ist daher auch bei mir eine „Volva" und entspricht somit der Volva von *Amanita*. Da also auch hier bei *Phallus* eine mächtige Hutvolva auftritt, wird es nicht wundernehmen, daß auch andere Fruchtkörperteile eine kräftige Volva besitzen. Daher werden bei der Glockenform des Hutes auch hier die Hymenophore, die von der Hutunterseite (Glockeninnenseite) gegen den Stiel wachsen, in das zwischen Glocke und Stiel befindliche Volvengeflecht eintauchen, die Hymenophore werden wieder auswachsen und an ihrem Ende (also gegen den Stiel hin) ein Geflecht bilden — also Erscheinungen, die ganz mit den Verhältnissen bei *Amanita* übereinstimmen. Es wird ein Geflecht zwischen Gleba und Stiel auftreten, welches im entfalteten Zustand auf seiner Außenseite die Gleba trägt und als „Hutteil" des Receptaculums angesehen wurde. Daß dieses Geflecht aus der Trama der Hymenophore seinen Ursprung nimmt, geht aus Ed. Fischers (1889) sorgfältigen Untersuchungen hervor.

Der „Hutteil" des Receptaculums ist mithin homolog der Manschette der Amaniten.

Die beiden homologen Gebilde unterscheiden sich aber in einer Hinsicht auffällig. Die Manschette der Amaniten ist gerieft, während die von *Phallus* grubig vertieft ist (daher der Name Gichtmorchel). Dies erklärt sich einfach daraus, daß dort Blätter, hier aber anfangs plumpzapfige Hymenophore vorhanden sind (Näheres s. Lohwag, 1924). Auch bei *Phallus* ist die Manschette zum Teil mit dem Stiel verknüpft, so daß sich zuerst nur der unterste, außerhalb der Manschette liegende Stielteil strecken kann (Lohwag, 1928). Vor nicht allzulanger Zeit (1930) habe ich dargelegt, daß die Verschiedenheit der oberen Stielhälfte bei *Mutinus caninus* gegenüber der unteren auf die innige Verwachsung der Manschette mit dem Stiele zurückzuführen ist. Bei dieser Untersuchung gelang mir mit Kallichrom die Durchflechtung von Stielvolva und Hymenophorhyphen augenfällig zu demonstrieren.

Die vielen Ähnlichkeiten in den Fruchtkörperverhältnissen von *Amanita* und *Phallus* sind nicht auf eine nähere Verwandtschaft zurückzuführen, sondern darauf, daß beide einhütige Pilze mit reichlichen Volven und mit einem dem Stiel knapp anliegenden Hute sind. Wegen des Hyphenreichtums im Hutstielwinkel wird dieses Geflecht auch bei

Phallus als „Grund-" oder „Zwischengeflecht" bezeichnet. Gegen letztere Bezeichnung wäre nichts einzuwenden, wenn nicht der eigentliche Hut auch dazu gerechnet würde und daher angenommen wird, daß sich die Hymenophore frei im Zwischengeflecht bilden. Dies ist morphologisch unmöglich.

Wir sehen also bei ähnlichen morphologischen Verhältnissen ein Organ — die Manschette — zwangsläufig entstehen. Eine Schutzfunktion kann diesem Gebilde nicht zugesprochen werden, da ja bei geschlossenem Hute dieser infolge seiner Lage Schutz gewährt und beim Aufschirmen die Manschette bei *Amanita* abreißt. Bei *Phallus* hebt die Manschette die Gleba empor und könnte also als Tragorgan angesehen werden, welches die Gleba recht bequem den Aasfliegen darzubieten hat. Doch bei anderer Fruchtkörperform ist die Stellung eine verkehrte und trotzdem erhalten sich diese Pilze ebenso gut. Ich meine den verwandten *Clathrus*, bei dessen vielhütigem Fruchtkörper (Lohwag, 1924) die Manschetten der einzelnen Hüte das rote Balkengitter mit innen anhaftender Gleba bilden.

Zusammenfassung.

Die Manschette der Amaniten ist aus den Lamellen hervorgegangen und ist mithin homolog dem Hutteile des Receptaculums von *Phallus* und Verwandten.

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Intorno ad alcuni micromiceti nuovi o rari.

Di Gabriele Goidànich.

(Con tavole III e IV.)

Nello studiare la flora micologica del Bolognese, mi sono imbattuto in alcune forme che mi sembrano meritevoli di essere trattate a parte.

La presente nota comprende la descrizione e la illustrazione di una varietà e tre specie nuove ed inoltre la ricerca dell'esatta posizione sistematica di altre. Sono micromiceti lignicoli appartenenti tutti alla classe degli *Hyphales*.

All'illustre Prof. Peyronel che mise a mia disposizione la sua ricca biblioteca e che mi fu largo di preziosi consigli, vadano i sentimenti della mia devota riconoscenza.

1. Scopularia scopula G. Goidànich sp. n.

Nel 1851 Preuss (1) descriveva, accompagnandola da una nitida quanto immaginosa illustrazione, la *Scopularia venusta* n. gen. et n. sp. Il nuovo genere è così riportato dal Saccardo (2): «Mycelium repens ramosum vel lignum penetrans, septatum; hyphae subsimplices erectae, septatae, supra capitatae penicillato ramoso-ramulosae; ramulis oppositis basi (simulate?) vaginato-connatis, strato mucoso primum tectae. Conidia acrogena coacervata, continua, subheterogenea». Da notarsi l'annotazione «simulate?» nei riguardi della unione vaginiforme nelle ramificazioni.

Posteriormente il Lindau (3), insistendo sulla non attendibilità dei caratteri dati dal Preuss, dice: «Die Beschreibung und Abbildung sind nicht besonders gut. Da aber der Pilz nicht wieder gefunden wurde, lassen sich dazu keine Ergänzungen geben.»

Non bisogna dimenticare il fatto che il Boudier (4) riportava al genere *Scopularia* un fungo trovato a Bourg in Francia nel 1901. L'A., sorvolando sulla discordanza esistente fra i caratteri della specie sua e quelli che si potevano dedurre dalla diagnosi del genere del Preuss, la include in

(1) Preuß, G. T. Übersicht untersuchter Pilze besonders aus der Umgegend von Hoyerswerda. Linnaea, Band VIII: Heft I, pp. 133—134. Berlin 1851.

(2) Saccardo, P. A. Sylloge Fungorum. Vol. IV. Patavii 1886.

(3) Lindau, G. Fungi imperfecti: Hyphomycetes. Rabenhorst's Kryptogamen-Flora von Deutschland, Österreich und der Schweiz. Band I. Abt. VIII. Leipzig 1907.

(4) In Lindau, G. Fungi imperfecti: Hyphomycetes, l. c. I. Hälfte, pp. 344—345.

quest' ultimo dandole il nome specifico di *S. Clerciana*. Essa passava in seguito al genere *Gloiosphaera* v. Höhnel ad opera del von Höhnel stesso che la riteneva identica alla sua *Gl. globulifera*, su cui aveva fondato il genere.

Discutibile è l'opportunità o meno di questo passaggio; serva, in ogni modo, la specie del Boudier come precedente per l'interpretazione dei caratteri del genere *Scopularia*.

Bisogna arrivare fino al 1928 perchè la *Scopularia* faccia di nuovo comparsa negli studi micologici. Lagerberg, Lundberg e Melin in un bellissimo lavoro (5) sui funghi lignicoli, frutto di sette anni di ricerche, descrivono fra gli altri il *Leptographium Lundbergii* n. gen. et n. sp. Secondo gli AA., tutti, o quasi, i caratteri presentati dal *Leptographium* corrispondono con quelli della *Scopularia*; rilevano, però, che: « The ramification which is said to distinguish the penicillated termination of the conidiophors in *Scopularia venusta* exhibits, however, definite differences between the two fungi ».

Pur richiamandosi alle osservazioni del Saccardo e Lindau e riconoscendo una notevole rassomiglianza fra i due funghi, concludono: « we did not deem it advisable to consider *Leptographium Lundbergii* and *Scopularia venusta* as identical forms » e danno del nuovo genere la descrizione che segue: « Mycelio fuligineo, fibrilloso-intricato, hyphis fertilibus erectis, uni- vel pluricellularibus, ramis iterum iterumque verticillato-ramosis apice dense penicillatis. Conidiis continuis, mox deciduis, ex apicibus ramulorum ultimorum non vere terminaliter orientibus sed ad basin conidii maturi semper unici adhaerentis subterminaliter productis, capitulum quasi mucosum diu formantibus »; e dell'unica specie *Lundbergii:* « Mycelio epi- et entoxylino. Ramulorum conidiigerorum sensim pallescentium apicibus omnino hyalinis. Conidiis hyalinis, ovoideis vel pyriformibus 8—12 × 4—6 μ, sensim dilute brunnescentibus.

Hab. in ligno *Pini silvestris*. — Forsan *Scopulariae venustae* Preuss synon. ».

E su questo argomento la bibliografia, per quanto a me consta, non ci offre altro.

Sopra un pezzo di legno morto, probabilmente di frassino, raccolto a Pieve del Pino nell' ottobre 1932, rinvenni il fungo che ho riferito al genere *Scopularia* e che descrivo. Disgraziatamente non mi è stato possibile ottenerlo in cultura artificiale, perchè il materiale fu studiato parecchio tempo dopo la raccolta e le spore avevano, evidentemente, già perduto la loro facoltà germinativa.

I conidiofori sono sottili, provvisti di una robusta parete, nodulosi, scuri, di solito non fascicolati. Singolare la conformazione della parte

(5) Lagerberg, T., Lundberg, G., Melin, E. Biological and practical researches into blueing in pine and spruce. Särtryck ur Svenska Skogsvardsföreningens tidskrift 1927. pp. 145—739. Stockholm 1928.

sporigena. Ad un dato momento nella parte superiore del conidioforo si produce, endogenicamente, un prolungamento a forma di clava con la parte dilatata volta verso l'alto; questo elemento è di un colore bruno meno intenso, fino ad essere completamente incolore. Parlo di origine endogena, pur riconoscendo che, senza alcun dubbio, questo modo di formazione non ne è la regola. Quel che si osserva è che la parete del conidioforo all'apice è rivolta all'infuori e dall'interno del piccolo imbuto che ne risulta fuoriesce l'elemento in parola.

E' nota tale caratteristica anche per altri funghi e viene attribuita all'alternarsi di condizioni ambientali sfavorevoli e favorevoli allo sviluppo, determinanti corrispondenti arresti e riprese nell'accrescimento del conidioforo.

Tutt'attorno all'elemento apicale si trovano collocati ad un medesimo livello numerosi rametti piccoli e tozzi, continui, completamente ialini; essi sopportano tre o quattro asticciuole claviformi che a loro volta si ramificano e su quest'ultime terminazioni si inseriscono i conidi ialini, come si vede in figura. Abbastanza di frequente vi è un solo ordine di ramificazioni.

Sulla presenza di un altro tipo di fruttificazione, riferibile al genere *Acrothecium,* dirò in seguito.

Lo studio di simile complicata terminazione, è, però, assai difficile a causa della trasparenza e dell'ammasso degli elementi che si prendono in esame. Ho cercato di isolarli l'uno dall'altro servendomi della soda caustica o mediante lo schiacciamento, colorando in seguito con tintura di iodio. In tav. III figg. 3 e 4 ho dato una rappresentazione un po' schematica della costituzione dei capitoli terminali e non escludo che alcuni particolari non siano completamente esatti; se in seguito avrò la fortuna di rintracciare materiale fresco, mi sarà possibile, credo, seguendoli nei vari stadi del loro sviluppo ottenerne una descrizione più accurata.

Confrontando questa specie con la *Gloiosphaera (Scopularia) Clerciana* (Boudier), risalta evidente l'analogia fra le due forme; fatta astrazione naturalmente dalla presenza, nell'ultima, di diversi ordini di ramificazioni primarie e dalla settatura nei rametti primari e secondari. Rimane ora da considerare la possibile inclusione di questo fungo nel genere descritto dal P r e u s s ' e per far questo è da vedere fino a qual punto siano attendibili le dichiarazioni dell'autore. Nell'esaminare il fungo a debole ingrandimento colpiscono unicamente le ramificazioni situate nella faccia anteriore, mentre la presenza di quelle situate nella parte opposta sfugge: fra le anteriori meglio definite sono le primarie, che generalmente compaiono in numero di tre. Osservando la figura che accompagna la descrizione della *Scopularia venusta,* vediamo, in un caso, tre diramazioni principali che potrebbero benissimo stare a rappresentare le tre primarie che ho detto. Per quel che riguarda la dichiarata disposizione vaginiforme potrebbe questa non essere causata altro che da una azzardata interpretazione

di come fosse disposto quel complicato groviglio di rami all' estremità del conidioforo, giustificata in parte dal fatto che il comparire in trasparenza degli elementi situati posteriormente, poteva, sempre s' intende ad una osservazione sommaria, darne l' illusione.

Non voglio con questo fare un appunto alla maggiore o minore scrupolosità descrittiva di un micologo come il P r e u s s , ma è probabile che una volta raccolte le caratteristiche principali, distintive del nuovo genere, non abbia sentito la necessità di indagare più a fondo quale fosse la natura di altri elementi la cui importanza per l'erigendo genere passava in seconda linea.

Considerato anche il precedente della *Gloiosphaera (Scopularia) Clerciana,* ritengo il fungo del Frassino come una specie nuova del genere *Scopularia* Preuss, avendo esso dimensioni neppure paragonabili con quelle dell' unica specie *venusta.* E, dandogli il nome specifico di *S. scopula,* come tale lo descrivo:

Scopularia scopula sp. n. (Tav. III, figg. 1—4)

Hyphis fertilibus gregariis, simplicibus, septatis, atris, 180—300 ≼ 5—7,5 μ, apice leniter incrassatis et pallidioribus ibique verticillatim ramoso-ramulosis; conidiis ovato-cylindraceis, hyalinis 2,5—3,5 ≼ 1—2 μ, cum ramulis diu muco obvolutis et capitulum ovatum 14 –22 ≼ 12 μ circ. efformantibus.

Hab. in ligno emortuo, probabiliter *Fraxini* sp. *(Orni?),* prope Bononiam Italiae, loco dicto « Pieve del Pino », Octobri 1932.

Obs. Socium *Acrothecium Scopulae* G. Goid., eius status macroconidicus.

Anche il *Leptographium Lundbergii* va considerato niente altro che una specie, nuova, del genere *Scopularia.* Basta infatti osservare la fig. 57 a pag. 252 del lavoro di L a g e r b e r g , L u n d b e r g e M e l i n per convincersi della notevole affinità del *Leptographium* con la mia. Rappresenta la figura i primi stadi di formazione di un capitolo terminale: sull'estrema parte del conidioforo sono disposte allo stesso livello le ramificazioni primarie. Se, poi, nelle successive ramificazioni si può incorrere in alcune diversità, queste sono bensì tali da delimitare un entità diversa, ma non escono, però, dai limiti di variazione concessi alle specie comprese nell' orbita di uno stesso genere.

Tolta quindi la discutibile dissimiglianza nel tipo di ramificazione, la sinonimia dei due generi risulta evidente. Questo, ad onor del vero, l' avevano già riconosciuto gli AA. stessi.

Credo, in ogni modo, che la specie *Lundbergii* sia da conservarsi, perchè la assoluta identità con la *S. venusta* è difficilmente comprovabile.

La *Scopularia Clerciana* Boudier, che il von H ö h n e l ha voluto riportare al genere *Gloiosphaera,* rappresenta quel caratteristico anello di congiunzione, frequente fra le due famiglie degli *Hyphales, Mucedinaceae* e *Dematiaceae,* che mina sempre più l' importanza tassonomica e l' esistenza delle famiglie stesse.

Concludendo, il genere *Scopularia* verrebbe ad essere così costituito:
Scopularia Preuss
(Syn. *Leptographium* Lagerberg et Melin).
Scopularia venusta Preuss
Scopularia Lundbergii (Lag. et Melin) G. Goid.
(Syn. *Leptographium Lundbergii* Lag. et Melin).
Scopularia scopula G. Goid.

2. **Acrothecium Scopulae** G. Goidànich sp. n.

Fra i conidiofori di *Scopularia scopula* se ne osservano di solito alcuni che, invece di portare all' apice la solita ramificazione caratteristica, sono formiti di un capitolo di spore in numero variabile da due a più che dieci, dapprima continue, ialine, in ultimo trisettate, scure, che riportano questa forma al genere *Acrothecium* Preuss.

Penso che l'*Acrothecium* debbasi ritenere come lo stadio macroconidico della Scopularia per il fatto della perfetta identità morfologica e strutturale dei conidiofori: scuri, settati, pallidi nella parte superiore. Si origina, endogenicamente, un elemento che, invece di differenziarsi in quell' appendice claviforme da cui si dipartono le ramificazioni nella *Scopularia,* produce direttamente numerosi conidi che rimangono ad esso accollati. Aggiungasi che non è raro osservare la promiscuità dei due tipi di fruttificazione: capitoli di *Scopularia,* cioè, che portano avvolti nel muco oltre i soliti conidi anche quelli dell' *Acrothecium.* Si avvicina all' *Acr. tenebrosum* (Preuss) Sacc., ed anche all' *Acr. bulbosum* Sacc., per l' aspetto generale; ne differisce, però, per il modo di attacco dei conidi. Con nessun' altra specie descritta ho potuto identificarlo; e ritenendolo una specie nuova, in considerazione delle caratteristiche sopra enunciate, propongo per esso il nome di *Acrothecium Scopulae* con la diagnosi seguente:

Acrothecium Scopulae sp. n. (Tav. III, figg. 5—6)

Conidiophoris gregariis, simplicibus, septatis, atris, 180—250 ≼ 5—7,5 μ, apice rotundatis ibique sporigenis; conidiis oblongis, utrinque rotundatis, curvatis, initio hyalinis guttulatisque, denique fuscidulis triseptatis 15—18 ≼ 7,5 μ, loculis extimis pallidioribus, in hypharum apice capitato-congestis.

Hab. in ligno emortuo, probabiliter *Fraxini* sp. *(Orni?),* prope Bononiam Italiae, loco dicto « Pieve del Pino », Octobri 1932.

Obs. Socia *Scopularia scopula* G. Goid., eius status microconidicus. Conidia in articulo hyalino, ex hypharum apice exiliente, posita.

3. **Mesobotrys macroclada** Sacc.

Ho trovato questo rarissimo e curiosissimo fungo sul legno di *Sambucus* presso il fiume Savena nell' Aprile 1932. Formava un feltro olivaceo scuro sull' esterno e nell' interno di un rametto ormai secco e privo del midollo. Ho tentato di coltivarlo, ed anche in questo caso i tentativi falli-

rono: fatto questo che, del resto, non stupisce, nota essendo la refrattarietà di tali saprofiti lignicoli ad adattarsi alle condizioni della coltura artificiale.

Premetto, innanzi tutto, che le dimensioni superavano di molto quelle date dal Saccardo per questa specie, avendosi dei conidiofori che raggiungevano l'altezza di 400 μ (secondo Saccardo 200 μ) e rami sterili la cui lunghezza era di 140—150 μ (Saccardo: «usque ad 60—70 μ longis»). Colpito da questo fatto, volli esaminare gli exiccata del genere *Chaetopsis* (pp. = *Mesobotrys*) che si conservano nell'erbario Saccardiano a Padova (6). Con stupore rilevai che, sebbene di statura un poco inferiore, anche la *Mesobotrys macroclada* del Saccarda ha dimensioni che si distaccano alquanto da quelle segnate nella diagnosi (i conidiofori hanno un'altezza di solito superiore ai 250 μ, ed i rami esterni raggiungono, seppure eccezionalmente, i 200 μ di lunghezza!).

Nel descrivere il genere *Mesobotrys* l'A. vi comprese alcune specie già appartenenti al genere *Chaetopsis*, basandosi, circa al carattere differenziale fra i due, quasi unicamente sulla diversa forma dei conidi: ovali nel primo, cilindrici in quest'ultimo. E questo modo di vedere fu in seguito accettato dagli altri micologi come il Costantin, Lindau, e Ferraris.

Però, se così effettivamente stessero le cose, l'esistenza di un tale genere sarebbe alquanto discutibile. Ma da quanto ho potuto vedere, almeno allo stato attuale delle nostre conoscenze, altri elementi entrano in giuoco: elementi, anzi, di importanza tassonomica assai rilevante.

Delle tre specie di *Mesobotrys* descritte, *fusca*, *graminicola*, *macroclada*, quest'ultima è senz'altro la più caratteristica.

Provvisti di un rigonfiamento basale da cui partono alcune ife rizoidiformi di aderenza, si innalzano rigidi i conidiofori della *Mesobotrys macroclada* Sacc. Colpisce subito la presenza delle appendici che ne adornano l'apice, assieme alla regolare disposizione verticillata dei rami conidiogeni, inferiormente.

E' facile intuire l'origine dei rami sterili, dalla trasformazione, cioè, di quelli fertili: questo perchè una tale trasformazione non avviene solamente nei due verticilli superiori, ma anche più in basso, persino nel primo verticillo a partire dalla base, ed è inoltre possibile osservare i vari termini intermedi di passaggio da conidiogeni a rami sterili. Essi sono lesiniformi, uncinati all'estremità, di lunghezza e di aspetto variabilissimo.

I conidiogeni nascono sul ramo principale generalmente in corrispondenza di un setto. L'attacco è del tutto caratteristico e ricorda quello già descritto del Peyronel (7) per la *Eriomenella tortuosa* (Corda) Peyr.: «Mais, à la partie inférieure de la vésicule (la parte vicinale del conidiogeno), il

(6) Ringrazio vivamente il Chiar. mo Prof. Gola, Direttore dell'Istituto Botanico di Padova, per aver voluto cortesemente mettere a mia disposizione il materiale richiesto Gli.

(7) Peyronel, B. Un Hyphomycète singulier: *Eriomenella tortuosa* (Corda) Peyronel. Bull. Soc. Myc. de France, T. XXXV, 4° fasc., pagg. 1—17 (1920).

se produit un court prolongement en forme de coude qui adhère et se soude au conidiophore » (l. c., pag. 5). Anche nella *Mesobotrys* il conidiogeno, inizialmente sottile, si rigonfia ad ampolla appena fuori dalla spessa membrana del conidioforo e produce alla base di detta ampolla un prolungamento che aderisce al conidioforo stesso. Il significato di un simile apparato ce lo dice stesso A.: «De cette manière l'insertion du conidiogène acquiert une solidité remarquable ». Infatti non potrebbe altrimenti sostenere il peso considerevole delle spore che in *Eriomenella tortuosa* rimangono aggruppate in gran numero alla sua estremità. Che significato avrebbe, invece, nella *Mesobotrys* in cui i conidiogeni sono « verticillati, apice monospori » secondo la diagnosi?

Un' osservazione un po' accurata ci dice subito, però, che ci troviamo di fronte a tutt' altra condizione.

Esaminando il fungo al microscopio direttamente, senza cioè distaccarlo dal legno su cui vegeta, si vedono i conidi non isolati all' apice dei conidiogeni, ma riuniti in ammassi regolari, cilindrici, più o meno allungati. Facendo uso dei preparati, sebbene in gran parte appena in contatto del liquido i conidi si rendano liberi l' uno dall' altro, è possibile vedere e studiare, quindi, più accuratamente la costituzione di questi agglomerati.

Ricordano perfettamente le caratteristiche spighette del genere *Clonostachys*. Non posso dire se anche nelle altre specie di *Mesobotrys* avvenga la stessa cosa, non essendomi stato possibile consultarne gli exiccata. Però i caratteri di queste ultime, che si possono dedurre dalla diagnosi, sono abbastanza concordanti, tanto da farle rientrare nell' ambito di uno stesso genere, considerando anche che un tale particolare é evidentemente sfuggito all' attenzione di osservatori precedenti per il fatto, che ho detto, del facile dileguarsi delle spighette durante la manipolazione ai fini dell' osservazione microscopica.

Inoltre va ricordato che in *Mes. graminicola* (B. et Br.) Sacc. si ha « conidiis globosis, quaternis, levibus ».

Non è azzardato quindi il supporre che la disposizione spiciforme dei conidi sia un carattere generico comune alle tre specie.

Per quanto ho detto, il genere *Mesobotrys* non trova una giusta collocazione nella tribù delle *Chloridieae,* in cui i conidi sono solitari: dovrà essere piuttosto compreso fra le *Stachylidieae* che hanno: « conidia capitato-aggregata ».

Credo quindi opportuno modificare sia la diagnosi del genere *Mesobotrys* Sacc., quanto, per ora, quella della specie *macroclada* Sacc.

Mesobotrys Sacc. emend.

Conidiophora erecta, fusca, septata, prope medium breve ramulosa. Ramuli verticillati apice sporigeni. Conidia ovoidea, hyalina, in apice ramulorum spiraliter congregata, spicam plus minusve elongatam formantia.

Mesobotrys macroclada Saccardo emend. (Tav. IV, fig. 7)

Caespitulis effusis, fusco-olivaceis; conidiophoris erectis 200—400 × 4—6 μ, e basi lenissime incrassata, filiformibus, sursum in appendices steriles pallidiores, subverticillatas abeuntibus, apice subulatis, parce septatis, fuligineis; ramulis verticillatis, inferioribus brevibus et sporigeris, superioribus (2—3 verticillis) praelongis usque ad 200 μ, subulatis, interdum aduncis, fuligineis; conidiis globoso-ovoideis, 3—3,5 × 2—2,5 μ, 1-guttulatis e hyalino dilutissime olivaceis, spicam elongatam subcylindricam efformantibus.

Hab. in ligno *Quercus*, Selva (Veneto); *Sambuci*, San Lazzaro di Savena (Bologna), Ital. bor.

Concludendo, fino a che ricerche ulteriori non compariranno a chiarire meglio le cose, il genere *Mesobotrys* ha posizione sistematica alquanto distante dal genere *Chaetopsis;* e la differenza fra i due generi non è basata unicamente sulla forma dei conidi, ma sul modo di inserzione di questi sul conidiogeno ed anche, secondo il mio parere, sulla costante disposizione verticillata dei conidiogeni stessi, nel primo.

Certo si è le nostre conoscenze sulla morfologia e sulla biologia di questo gruppo di ifomiceti sono molto scarse e con uno studio più accurato si riuscirà a mettere in evidenza, in essi, particolari di interesse sistematico rilevanti: dall' esame fatto della *Chaetopsis grisea* (Ehrenb.) Sacc. e *stachyobola* Corda dell' erbario del Saccardo, ho notato che le descrizioni che ne possediamo sono senz'altro errate. La preziosità del materiale non mi ha permesso un esame ripetuto che mi avrebbe dato la sicurezza di alcune osservazioni in proposito; ma su questo argomento spero di ritornare a suo tempo.

4. **Monotospora altissima** G. Goidànich sp. n.

Specie ben caratterizzata per la notevole lunghezza dei conidiofori, la dimensione e l'aspetto dei conidi. Osservando il fungo al binoculare si vedono due o tre spore raggruppate all' apice. Queste, poi, cadono facilmente al più piccolo urto, tranne la centrale, che, anzi, rimane saldamente attaccata. Questo fatto ci sta ad indicare la formazione ripetuta dei conidi: cosa, del resto, già nota per la *Monotospora sphaerocephala* Berk. et Br. I conidi sono grandi, ovali, provvisti di un grosso nucleo e, alla base, di un pedicello cavo.

Per la notevolte altezza dei conidiofori, propongo per la specie il nome di *M. altissima*.

Monotospora altissima n. sp. (Tav. IV, figg. 8—9)

Caespitulis indefinite effusis; conidiophoris septatis, simplicibus, atris, rigidis, 600—850 μ longis, 7,5—8,5 μ latis; conidiis maximis, obovatis, atris, nucleo obscuriore praeditis, basi pedicellatis et hylo instructis 35—50 × 29—31, levibus.

Hab. in ligno putrido, prob. quercino, prope Bononiam Italiae, loco dicto « Farneto », Octobri 1932.

5. **Helicomyces roseus** Link, var. **major** G. Goidànich var. n.

Incluso nella specie *roseus* Link questo *Helicomyces* per il suo aspetto generale ad essa molto simile, quantunque per le sue caratteristiche morfologiche meriterebbe, forse, di essere trattato come una specie a sè.

Il fungo cresceva sulla superficie di taglio di un albero nel greto del torrente Idice, su cui formava ampie macchie di un colore roseo pallido. I conidiofori sono di lunghezza variabile, generalmente semplici, attenuati verso l'estremità e non rigonfi, come dice la diagnosi del Link. Talvolta possono essere anche ramificati, ma questo assai più di rado: in ogni caso presentano uno o due setti ben evidenti (rr. continui). L'attacco del conidio sul conidioforo avviene mediante una superficie piana disposta obliquamente rispetto all'asse del conidioforo stesso, come si vede in tav. IV, fig. 10, e la traccia di questo modo d'inserzione rimane visibile in seguito anche quando il conidio a maturità si distacca. Altro particolare è che, abbastanza di frequente, i conidi (probabilmente i meno maturi) non si liberano disarticolandosi nel punto di congiunzione col conidioforo, ma una parte di quest'ultimo rimane ad essi solidamente attaccata, sì da simulare un elemento del conidio stesso: fatto questo che si rileva subito osservando la caratteristica obliquità del setto ed il leggero rigonfiamento che lo precede. I setti lono evidenti e numerosissimi. Dei conidi ho ottenuto facilmente anche la germinazione: basta metterli in acqua in goccia pendente. Emettono filamenti micceliali sia apicalmente che lateralmente, in corrispondenza di ogni elemento in cui i setti dividono il conidio. Tali filamenti sono settati a decorso irregolare, possono essere esili oppure grossi, tanto da riprodurre in certi casi la spora dell'*Helicomyces*, senza mai, però, avvolgersi a spirale.

Helicomyces roseus Link, var. **major** var. n. (Tav. IV, fig. 10—11)

Caespitulis late offusis, roseis; conidiophoris simplicibus vel apice furcatis, ibique sporigenis, 8—45 × 4—5 μ, continuis vel saepius 1—2 septatis; conidiis spiraliter convolutis, longitudine variabili et usque ad 300 μ, praecipue autem 250—280 μ longis, 3—5 μ diam., eximie pluriguttulatis et septatis.

Hab. in ligno putri prope Bononiam Italiae, loco dicto « San Lazzaro di Savena », Septembri 1932.

Obs. A typo differt conidiis multo longioribus.

Dal Laboratorio di Biologia del R. Ist. Sup. Agrario di Bologna
10 Genn. 1933 — XI°

Spiegazione delle tavole.

Tav. III.

Scopularia scopula G. Goid.

1. Vari conidiofori ingranditi.
2. Conidioforo maggiormente ingrandito.
3. Parte terminale di un conidioforo.
4. Ramificazioni primarie e secondarie.

Acrothecium Scopulae G. Goid.

5. Conidioforo e conidi.
6. Conidioforo e conidi giovani.

Tav. IV.

Mesobotrys macroclada Sacc.

7. Aspetto del fungo (ingr.).

Monotospora altissima G. Goid.

8. Conidioforo e conidio.
9. Conidio.

Helicomyces roseus Lk., var. *major* G. Goid.

10. Attacco del conidio sul conidioforo.
11. Conidio.

Mycoflora domingensis exsiccata[1]).

(Cent. II, no 101—200.)

By R. Ciferri.

The present paper reports 97 species, varieties or forms of microfungi (125 specimens) found on 123 different host plants. Of the fungi here studied, 6 species (*Meliola caput-medusae, M. swieteniae, M. capilligera, M. canellae, M. paralabatiae,* and *Camptomeris desmanthi*), 7 varieties (*Meliola angusta* var. *leptogoni, M. magnoliae* var. *illicii, M. tonkinensis* var. *potomorphes, M. durantae* var. *lippiae, M. bicornis* var. *erythrinae, Ustilago Hieronymi* var. *insularis, Cerebella paspali* var. *panici*) and 2 forms (*Oidium erysiphoides* f. *ingae* and *O. erysiphoides* f. *wissadulae*) are new to science. Of the other species, varieties and forms, about one half (43 species, varieties and forms) are new to Santo Domingo. Of the 123 host plants, 33 are not previously recorded. Also a new combination (*Meliola atricha*) is proposed.

The collector was the writer, unless there is a special note, but many fungi were collected by the writer in combination with Dr. E. L. Ekman or by that regretted botanist alone.

No. 67 ter. — *Albugo ipomoeae-panduranae* (Schw.) Sw., Journ. Mycol., Vol. VII, p. 112 (sensu lato).

On *Ipomoea rubra* (Vahl) Millsp., Valle del Cibao, prov. La Vega, at Río Verde, 8. III. 1931. — All over the world.

The species is apparently rare on this host plant, new to Santo Domingo.

No. 133. — *A. platensis* (Speg.) Sw., Journ. Mycol., Vol. VII, p. 113 (1892).

On *Boerhaavia erecta* L., Valle del Cibao, prov. Santiago, Santiago, Quinigua, roadside, 19. II. 1931. — Asia, Africa, South America, West Indies.

Not rare.

No. 116. — *Pseudoperonospora portoricensis* (Lam.) Curzi, Riv. Patol. Veget. (Pavia), Vol. XVI, p. 6 extr. (Oct. 1926).

On *Melia Azedarach* L., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, near Rio Yaque, 1. XII. 1930. Coll. R. Ciferri & E. L. Ekman. — Porto Rico.

This species, localized in Porto Rico and Santo Domingo, appears very frequently during the rainy seasons.

No. 131. — *Asterina coriacella* Speg., Bol. Acad. Ci. Cordoba, Vol. XI, p. 560 (1889).

[1]) For the first cento of these fungi, see Annal. Mycol., Vol. XXIX, p. 283 (1931).

On *Cestrum daphnoides* Griseb., Valle del Cibao, prov. Santiago, Tamboril, roadside, 12. II. 1931. — Porto Rico, St. Jan., South America.

Previously found in Santo Domingo on *Cestrum diurnum* L. The host plant is new for this species.

No 45. — *A. caricarum* Rehm, Hedwigia XXXIV, p. (161) (1895).

On *Carica papaya* L. (Cult.), Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, in fields, 16. VI. 1928. Det. F. Petrak. — South America, West Indies.

Not rare during the rainy seasons. New species to Santo Domingo.

No. 111. — *Guignardia pipericola* Stev., Trans. Ill. Acad. Sc., Vol. X. p. 183 (1917).

On *Piper medium* Jacq., Cordillera Septentrional, prov. Santiago, Santiago, Las Lagunas, Pozo Hediondo, ca. 500 m., 3. XII. 1930. Coll. E. L. Ekman & R. Ciferri. — Porto Rico.

New species to Santo Domingo, previously found on the same host plant in Porto Rico only. This species is rather frequent, but found as scattered and frequently poor specimens.

No. 118. — **Meliola angusta** Stev. & Teh., var. **leptogoni** Cif., n. var. (Part of the type specimen).

The variety differs from the species chiefly by the straight to curved, and obtuse to dentate setae, 590—870 μ in length, with a slightly bulbose base; also by the densely aggregated capitate hyphopodia, and the slightly longer spores (40—44 by 16,5—18 μ).

On living leaves of *Leptogonium domingense* Benth., Llano Costero, prov. Santo Domingo, Santo Domingo City, El Manicito, pebbly savannas. 12. II. 1930. Coll. R. Ciferri.

The species was described on *Coccoloba*, the formula being 3112. 3223. The formula of the variety would be: 34½2. 4223. This is the first Meliolinea found on the genus *Leptogonium*.

No. 46 bis. — *M. byrsonimae* Stev., Ill. Biol. Mon., Vol. II, p. 49 (1916)

On *Byrsonima spicata* (Cav.) L. C. Rich., Cordillera Central, prov. Santo Domingo, Villa Altagracia, 12. XII. 1926. — Porto Rico, Panama

No. 46 ter. — On *Byrsonima* sp. (aff. *B. spicata*), Valle del Cibao, prov. La Vega, Sabana de San Lorenzo, in thickets, 3. III. 1930.

No. 46 quat. — On *Byrsonima* sp. aff. *B. crassifolia* (L.) H. B. K. or var., Llano Costero, prov. Santo Domingo, Guerra, Cuenca, in savanna thickets, 13. VIII. 1929. Coll. E. L. Ekman & R. Ciferri.

Not rare in Santo Domingo on many species or varieties of *Byrsonima*. The perithecia are frequently larger than in the type, the formula being 3111. 5233 instead of 3111. 5223. Also the characteristics of the setae are slightly variable, as well as the shape and size of the capitate hyphopodia.

No. 166. **M. atricha** (Speg.) Cif., n. comb.

Meliola laxa Gaill. var. *atricha* Speg., An. Mus. Nac. Buenos Aires, Vol. XXXII, p. 355 (1924).

Irenina atricha Stev., Annal. Mycol., Vol. XXV, p. 469 (1927).

On *Myrcia deflexa* (Poir.) DC., Cordillera Central, prov. La Vega, Bonao, Sabana del Puerto, moist forests, 7. VII. 1926. — Argentine.

First record outside the Argentine. This species was described on *Eugenia,* in the same family of host plants. No Meliolineae are known to occur on *Myrcia.*

No. 165. — **M. durantae** Gaill. var. **lippiae** Cif., n. var. (Part of the type specimen).

The variety differs from the species by very abundant longer setae (250—740 μ) and by the narrower and shorter spores (30—34 by 9—11 μ). The black, velvety spots are confluent, and cover all or almost all the upper surface of the leaves, rarely the lower surface.

On living leaves of *Lippia nodiflora* (L.) L. C. Rich., Llano Costero prov. Santo Domingo, Santo Domingo City, road to La Caleta, 10. II. 1930. Coll. R. Ciferri.

The formula of the species, found on *Duranta* in Ecuador, is: 3111. 4332; of the variety is: 3111. 3223. The abundance and density of the colonies, and the enormous abundance of setae are characteristics of the variety.

No. 150. — *M. sororcula* Speg., Bol. Acad. Nac. Ci. Cordoba, Vol. XI, p. 230 (1889).

On *Eupatorium odoratum* L., Valle del Cibao, prov. Santiago, Santiago, road to San José de las Matas, 16. III. 1931. — Jamaica, South America, Porto Rico.

This species is rather variable, the study of a series of Dominican specimens showing that the range oscillates from the type to the var. *vernoniae* Stev. (with likewise swollen tips of the larviform appendages). The var. *portoricensis* Stev. has spores larger than in the type (formula: 3201. 4220), and larger also than in the average of our specimens, whose formula is: 3201. 3220, the formula of the type species being 3201. 5220. *M. sororcula* on *Liabum* (cfr. Stevens, Annal. Mycol., Vol. XXV, p. 424. 1928) is, also, very similar to the specimens on *Eupatorium.*

No. 153. — *M. tabernaemontanae* Speg. var. *forsteroniae* Stev., Ill. Biol. Mon., Vol. II, p. 50 (1916).

On *Forsteronia corymbosa* (Jacq.) Mey., Valle del Cibao, prov. La Vega, Cotuí, hillside, 18. IV. 1930. Coll. E. L. Ekman & R. Ciferri. — Porto Rico.

New variety to Santo Domingo, and here very rare. This is the first record outside Porto Rico.

No. 152. — **M. bicornis** Wint. var. **erythrinae** Cif., n. var. (Part of the type specimen).

The variety differs from the species by the setae being constantly denticulate (never furcate), sometimes more or less curved or slightly swollen at the tip, but never uncinate; the mycelium is crooked; the capitate hyphopodia have a spherical to ovate head, and an evident basal cell; the spores, of 37—44 by 10—12 μ, are narrowed at the septa.

On *Erythrina micropteryx* Poepp. [*E. Poeppigiana* (Walp.) O. F. Cook], Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, 7. VII. 1929. — Porto Rico.

Stevens (Ill. Biol. Mon., Vol. II, p. 551—552, 1916) ascertained the variability of *M. bicornis*, whose formula is: 3133, 4221, the formula of the new variety being: 3131, 4221. The same author and other mycologists later recognized many varieties, as: var. *calopogonii* Stev., var. *amerimni* Stev., var. *tephrosiae* Beeli, var. *milletiae* Beeli, var. *Robinsonii* (Syd.) Stev., more or less of the same value as our variety.

No. 108. — *M. pteridicola* Stev., Ill. Biol. Mon., Vol. II, p. 28 (1916).

On *Asplenium cristatum* L., Valle del Cibao, prov. Duarte, Pimentel, near the town, 11. II. 1930. — Costa Rica, Panama, Porto Rico.

This species, found on *Aneimia* and *Adiantum*, is new on host plants of the genus *Asplenium*. This Meliolinea is new to Santo Domingo.

No. 21. — *M. clavulata* Wint., Hedwigia, Vol. XXV, p. 98 (1886).

On *Ipomoea tiliacea* (Willd.) Choisy, as no. 152, in fields, 7. VII. 1929. Africa, Asia, Tropical America.

No. 21 bis. — On *Ipomoea phyllomega* (Vell.) House, Cordillera Central, prov. Santo Domingo, Villa Altagracia, rain forest, 11. II. 1930.

A species commonly found on *Ipomoea* spp. and allied genera of Convolvulaceae, but new on *I. phyllomega*.

No. 161. — *M. Lagerheimii* Gaill., Le genre Mel., p. 49 (1892).

On *Ilex montana* (Sw.) Griseb., Cordillera Central, prov. Azua, San Juan de la Maguana, Loma La Vieja, in pineforests, ca. 1300 m., 28. VIII. 1929. Coll. E. L. Ekman. — Ecuador.

First record for this species outside Ecuador. The spores are slightly shorter and narrower than in the type specimen, at least according to the description.

No. 162. — **M. magnoliae** Stev. var. **illicii** Cif., n. var. (Part of the type specimen).

The variety differs from the species by the mycelium being frequently notched; the setae, rarely simple, are generally bifurcate at the tip, the first ramification being over 40 μ (from 50 to 75 μ) from the free end; the perithecial setae are identical with mycelial ones, from 200 to 450 μ in length; the apical branches are short (10—15 μ in length), without teeth; the ascospores are 40 μ or less in length.

On *Illicium parviflorum* Michx., as no. 21 bis, Loma Isabella, ca. 700 m., 6. I. 1929. Coll. R. Ciferri.

This variety, whose formula is: 3141. 4222, is allied to *M. magnoliae* found in Porto Rico on *Magnolia* (formula: $31\frac{1}{3}1.$ 5223), but it differs in the branching and length of setae, length of spores, etc. In both type and variety, capitate and mucronate hyphopodia are but little different. This is the first Meliolinea found on *Illicium*.

No. 169. — *M. garciniae* Yates, Philipp. Journ. Sci., C. Bot., Vol. XIII, p. 369 (1918).

On *Mammea americana* L., as no. 118, Santo Domingo City, banks of Río Ozama, 14. XII. 1929. Coll. E. L. Ekman. — Philippines, Porto Rico?

First record of this species outside the Philippine Islands. In spite of the differences, it is possible that the species is the same recorded in Porto Rico under *M. paulliniae*. The fungus on *Mammea* (formula: 3111. 4323) differs in many ways from the *Meliola* on *Garcinia* (formula: 3111. 4323). The fungus studied has capitate hyphopodia, cylindrical or cylindrical-acuminate, lengthened, uniform in shape (not sub-globose or ovate), of 15—18 by 10—12 μ (instead of 12—14 by 11—12 μ), without or with a very short basal cell (4 μ or less in length, instead of 8—10 μ); the perithecia are of 130—150 μ in diameter (instead of 200—300 μ) and the spores 42—48 by 18,5—22 μ (instead of 50—55 by 18—20 μ). The colonies are not crustose, but arachnoid and amphigenous. If new collections of the fungus on the same host plant confirm these differences, the *Meliola* on *Mammea* must be considered distinct from *M. garciniae*.

No. 163. — **M. caput-medusae** Cif., n. sp. (Part of the type specimen).

Black, scattered (rarely confluent), small colonies, frequently of 1 mm. diameter (rarely 2 mm), found on the upper surface of the leaf; mycelium composed of hyphae loosely interlaced, never anastomosed, brown, septate, branched at a right angle, 5,5—7,5 μ in diameter; capitate hyphopodia ovate, or ellipsoid, rarely conical to irregular in shape, 15—22 by 11—18 μ, alternate, not frequent, with a very distinct basal cell, of 3,5—7 μ at the base, 2—4 μ at the end; mucronate hyphopodia bottle-shaped, sub-acuminate, curved, very scarce, of 18—22 by 5—6 μ in length; mycelic setae scattered, rarely aggregated from 2 to 3, black, opaque, rigid, straight, about 200 μ in length, 5—6 μ thick at the base, 4—5 μ at the free acuminate end; perithecial setae identical with the mycelial ones, or slightly shorter, but very abundant, forming a more or less developed perithecial crown; perithecia black, small, slightly flattened, 120—165 μ in diameter; asci very diffluent, 2—4-spored; spores cylindrical to elliptical, or ovoid, brown, 4-septate, slightly narrowed at the septa, 33—39 μ by 13—17 μ; paraphysoides indistinct, mucose.

On *Jacaranda Poitaei* Urb., Cordillera Central, prov. Santiago, San José de las Matas, pinewoods, 26. V. 1929. Coll. R. Ciferri.

The formula of this rare but very interesting species is: 3411. 3221. From the few species supplied with mycelial and perithecial setae, it is easily distinguished by the few mycelial setae and the abundant perithecial

ones, but of identical length. It is similar to *M. hopeae* Yates, found on Dipterocarpaceae, but has only a few characteristics in common.

No. 101. — **M. tonkinensis** Karst. et Roum. var. **potomorphes** Cif., n. var. (Part of the type specimen).

Epiphyllous, scattered, very indistinct colonies, 1 mm., rarely 2 mm., diam., occurring on the upper surface of the leaves, rarely on the lower surface, then more congregated; mycelium composed of irregular, black to brown, scarcely branched hyphae, 5—8 μ in thickness; capitate hyphopodia very variable, spherical, elliptic, club-like, lobate, antrorse or irregular in shape, alternate, 24—30 μ long, with a well defined basal cell of 6—10 μ, and head of about 15 μ in diam.; mucronate hyphopodia 22 to 27 μ in length; larviform perithecial appendages 87—98 by 6—8 μ, uncinate or twisted-uncinate; perithecia quite smooth; ascospores 42—48 by 17—19 μ, narrowed at the septa or not.

On *Potomorphe umbellata* (L.) Miq. [*Piper umbellatum* L.], Cordillera Septentrional, prov. Santiago, Santiago, Loma Diego de Ocampo, ca. 650 m. 18. VIII. 1929. Coll. R. Ciferri.

The formula of the variety would be: 3½01. 4220. The variety is similar to *M. tonkinensis* var. *cecropiae* Stev. (under the genus *Irene*), of the formula: 3201. 4220, having capitate hyphopodia 30—40 μ in diameter, with a basal cell of 5 μ, and an head of 11 μ, mucronate hyphopodia of 20 μ, larviform appendages of 36 by 11 μ. Other small differences are recognizable between the Stevens' and our variety, as well as the different host plant. Stevens' observations show that in the variety *cecropiae* the appendages, as well as the perithecia, are very variable.

No. 159. — *M. hurae* Syd., Annal. Mycol. Vol. XXVIII, p. 56 (1930).

On *Hura crepitans* L., as no. 152, at Arroyo Caimito. 18. IV. 1930. — Venezuela.

New species to Santo Domingo, here abundant, and first confirmation of the species. As it appears from the specimens, macroscopic characteristics of our specimens are very similar to the Venezuelan fungus, but microscopical characteristics are, in part, different. The Venezuelan fungus has capitate hyphopodia more regular in shape, and mucronate hyphopodia slightly longer and broader, perithecia of greater diameter, perithecial setae always present but few in number, while in our specimens they are normally absent. In the *Meliola* as described by Sydow, true setae are present (genus *Irenopsis* Stev.); in our specimens the setae are very similar to perithecial appendages (genus *Irene*), or they are true perithecial appendages; the setae (or appendages) are 50—140 by 6—8 μ in the Venezuelan specimens, but 28—36 by 12—15 μ in Dominican specimens. The formula of Sydow's species would be: 3401. 3121; the formula of the Dominican specimens would be: 3201. 3210 or, at least, 3½01. 321½. A comparison with the authentic specimen and confirmation of the species, has been made by Dr. H. Sydow.

No. 177. — *M. circinans* Earle, Bull. N. York Bot. Gard., Vol. III, p. 304 (1905).

On *Cladium mariscus* (L.) R. Br., as no. 152, road to Salcedo, 22. III. 1931. — Argentine, British Guiana, Southern U. S. A., Porto Rico, Trinidad.

This species, new to Santo Domingo, has perithecial setae acuminate and shorter than the mycelial, and mycelial setae longer and acuminate, rarely obtuse.

No. 178. — *M. Merrillii* Syd., Philipp. Journ. Sc., C. Bot., Vol. VIII, p. 479 (1913).

On *Cissus sicyoides* L., as no. 152, Arroyo El Caimito, 12. XII. 1929. — Central and South America, Philippines, Porto Rico, South Africa.

A common species.

No. 121. — *M. nigra* Stev., Ill. Biol. Mon., Vol. II, p. 37 (1916).

On *Laguncularia racemosa* (L.) Gaertn., as no. 118, Haina, at Río Jaina. 12. III. 1926. — Porto Rico.

No. 121 bis. — On *Bucida buceras* L., Cordillera Septentrional, prov. Puerto Plata, Sosúa, 20. III. 1930. Coll. E. L. Ekman.

An apparently rare species, recorded only once in Porto Rico. The fungus on *Laguncularia* (type host plant) is but little different from the description: capitate hyphopodia are irregular in shape, and, frequently sinuate; setae not more than 200 μ in length, and normally shorter; perithecia 180 μ in diameter or less; spores slightly smaller (30—34 by 10—12 μ). According to our specimens, the formula would be: 3111.3221; the formula following Stevens: 3111. 4223. On *Bucida buceras* (new host plant for the species, and the first Meliolinea found on the genus *Bucida*), the fungus is very similar to those on *Laguncularia,* particularly in shape, distance, disposition etc. of the hyphopodia, frequently 30—34 μ in diameter. The setae are frequently scarcer, but tufted, or irregularly distributed; the spores are 37—41 by 14—17 μ.

No. 176. — *M. crescentiae* Stev., Annal. Mycol., Vol. XXVI, p. 240 (1928).

On *Crescentia cujete* L. (Cult.), as no. 152, 27. II. 1930; 15. IV. 1930. — India, Trinidad.

This species, new to Santo Domingo, is known only on *Crescentia* sp. in Trinidad, and on *Heterophragma Roxburghii* in India. It is very rare.

No. 173. — *M. dipholidis* Stev., Ill. Biol. Mon., Vol. II, p. 44 (1916).

On *Dipholis angustifolia* Urb., Cordillera Central, prov. Santiago, Mao, road to Monción, pineland, 24. V. 1929. — Porto Rico.

First record outside Porto Rico. Spores are slightly longer than the type (to 42 μ) and the setae also longer (to 575 μ). Other characteristics agree with the description. According to the morphology of our specimens, the formula will be: 3111. 4223, instead of 3111. 3222. The host plant is new to this species.

No. 188. — *M. abrupta* Syd., Annal. Mycol., Vol. XV, p. 181 (1917).

On *Pictetia spinifolia* (Desv.) Urb., as no. 118, road to La Caleta. 10. II. 1930. Coll. R. Ciferri & E. L. Ekman. — Philippine Islands.

First record outside the Philippines for this species, known to date only on *Derris*. The fungus in our specimens is slightly different from the description: the colonies, localized almost always on the upper surface of the leaves, are denser (never arachnoid), frequently occupying the entire surface of the leaf, by the confluence of the small colonies (1—2 mm. diam.). The setae are longer (to 525 μ) and the spores broader (to 20 μ). The group-number of the fungus on *Pictetia* is: 3113. 4223, the formula of the same species on *Derris* being: 3113. 4222. This is the first Meliolinea recorded on *Pictetia*.

No. 189. — *M. Tonduzi* Speg., Bol. Acad. Nac. Ci. Cordoba, Vol. XXIII, p. 190 (1919).

On *Xylosma buxifolium* A. Gray, as no. 188. 10. II. 1930. Coll. R. Ciferri & E. L. Ekman. — Costa Rica.

First record outside the type locality (Costa Rica), where it was described on *Xylosma*. The description agrees well with our specimens.

No. 190. — *M. intricata* Syd., Philipp. Journ. Sci. C. Bot., Vol. VIII, p. 268 (1913).

On *Rhynchospora marisculus* Nees, as no. 121 bis, at Cabarete. 20. III. 1930. — Philippine Islands.

First record outside the Philippines, where it is known on *Scirpus grossus*. The description corresponds very well with the characteristics of the fungus collected in Santo Domingo. This species is well characterized by the enormous abundance of the hyphopodia, under the microscope appearing almost as an opaque, brown-blackish, continuous layer. The setae are obtuse to sub-acuminate, with a very light, almost hyaline free end, but a brown to black, opaque base. The formula is the same obtained from Sydow's description.

No. 151. — *M. teramni* Syd., Annal. Mycol., Vol. XV, p. 193 (1917).

On *Entada gigas* (L.) Fawc. & Rendle (*E. scandens* (L.) Benth.), as no. 166, 6. VII. 1928. — Philippine Islands.

No. 151 bis. — On *Teramnus uncinatus* (L.) Sw., as no. 152, in fields. 14. V. 1930.

First record for this species outside the type locality.

M. Robinsonii Syd. (a variety according to Stevens), found on *Entada* also in the Philippines, is clearly related to *M. teramni*, but the setae are always simple (in *M. teramni* simple or dentate).

No. 192. — *M. substenospora* v. Höhn., Sitz. K. Akad. Wien. Math.-Naturkl., Vol. CXVIII, p. 317 (1909).

On *Uniola virgata* (Poir.) Griseb., as no. 121 bis, on some coral reefs. 20. III. 1930. Coll. E. L. Ekman. — Java, Philippines, Africa.

New species to the New World. The specimens studied are, in some respects, intermediate between *M. substenospora* (typically found on *Phragmites* in Java, but recorded also on *Rottboellia* and *Oplismenus* in Asia and Africa), and *M. chaetochloae* Stev. (typically found on *Chaetochloa* in Ecuador). The general habit is like that of *M. substenospora,* particularly in the dense and crustose colonies, but the hyphopodia are more uniform in shape, the setae are longer (to 500 μ instead of 300 μ), and so on. The shape of the capitate hyphopodia is similar to those indicated on *M. chaetochloae,* but it differs in the larger spores (40—44 by 18—20 μ instead of 29—32 by 11—13 μ), and other peculiarities, not to mention the evident parasitism of *M. chaetochloae,* in contrast with the epiphytism of the *Meliola* on *Uniola.* The formula deduced from the study of our specimens is identical with the formula of *M. substenospora.* It is possible that the fungus on *Uniola* should be separated as a variety of von Höhnel's species.

No. 197. — *M. burseracearum* Stev., Annal. Mycol., Vol. XXVI, p. 199 (1928).

On *Tetragastris balsamifera* (Sw.) O. Ktze, as no. 166, 14. IX. 1928. — Panama.

First record outside the type locality, the Republic of Panama; it was described on *Tetragastris panamensis.* The setae, normally obtuse (dentate setae are very rare), are frequently 650—700 μ in length, instead of 450 μ, and the spores larger (50—54 by 24—28 μ, instead of 43—46 by 18 μ). Microscopical and macroscopical features other than the preceding agree well. The formula of the species, is, following Stevens: 3131. 4222: the formula deduced from the study of our specimens would be: 3131. 4233 to 3131. 5323.

No. 198. — *M. plebeja* Speg., Bol. Acad. Nac. Ci. Cordoba, Vol. XI. p. 238 (1889).

On *Solanum rugosum* Dun., as no. 46 bis, moist places, 6. I. 1929. — Brazil, Argentine, Paraguay.

A common species.

No. 199. — *M. panicicola* Syd., Annal. Mycol., Vol. XII, p. 552 (1914).

On *Panicum glutinosum* Sw., as no. 46 bis, Loma Marián Chicle, ca. 800 m., 6. I. 1929. Coll. E. L. Ekman. — Philippine Islands.

First record outside the Philippine Islands. The specimen in hand is intermediate between *M. panici* and *M. panicicola,* but resembling more the last-named species. The capitate hyphopodia are normally entire, rarely 1-lobate, exceptionally 2-lobate; the setae are shorter than in the *M. panicicola* (280—330 μ instead 400—500 μ). Other characters are almost identical.

No. 153. — *M. mayaguesiana* Stev., Ill. Biol. Mon., Vol. II, p. 32 (1916).

On *Palicourea barbinervis* P. DC., Cordillera Central, prov. Santo Domingo, Santo Domingo City, near La Cumbre, ca. 300 m., 3. III. 1930.

Coll. E. L. Ekman & R. Ciferri. — British Guiana, Ecuador. Porto Rico.

New species to Santo Domingo, frequently not well developed, or only collected in poor specimens.

No. 182. — *Meliola conferta* Tehon, Bot. Gaz., Vol. LXVII, p. 502 (1919).

On *Rhacoma crossopetalum* L., Cordillera Septentrional, prov. Puerto Plata, at Puerto Blanco, 19. IV. 1931. — Mona Island (Porto Rico).

A very rare species, first found in a very localized geographical area in Porto Rico. If *M. conferta* Doidge can be mantained as a specific entity and in the genus *Meliola*, the name *M. conferta* Tehon must be changed.

No. 185. — *M. triloba* Wint., Hedwigia, Vol. XXV, p. 95 (1886).

On *Pilea parietaria* (L.) P. DC., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, road to Mao, hillside, 3. III. 1931. — Africa, Porto Rico, Hawaii.

An apparently rare species, that agrees well with the description.

No. 48 bis. — *M. bidentata* Cooke, Grevillea, Vol. XI, p. 37 (1882).

On *Distictis lactiflora* (Vahl) P. DC., [*Macrodiscus lactiflora* (Vahl) Bur.], as no. 185, hillside, 14. III. 1931. — South America, Southern U. S. A., Philippines, Porto Rico.

A rather variable species. On the same host plant in Porto Rico was found *M. furcata* Lév. In our opinion, intermediate forms between *M. bidentata* and *M. furcata* are very abundant, and the typical species are at the ends of the series. A comparative study of a collection of specimens living on different host plants, chiefly in relation to the morphology of the setae, should be made, and, while awaiting this revision, we refer the *Meliola* on Bignoniaceae to *M. bidentata*, and the *Meliola* on Palmae to *M. furcata*.

No. 92 bis. — *M. tabernaemontanae* Speg., An. Mus. Nac. Buenos Aires. Vol. XXIII, no. 1345 (1922).

On *Plumiera pluvialis* Urb. et Ekm. n. sp., ad interim, as no. 199. ca. 800 m., 6. I. 1930. — Argentine, Costa Rica, Panama, Porto Rico, Venezuela.

The spores are slightly larger in our specimens than in the type, and the setae are intermediate between this species and the var. *forsteroniae* Stev., being about 500 μ in length.

No. 184. — **M. swieteniae** Cif., n. sp. (Part of the type specimen).

When not parasitized, the colonies are black, small (normally not more than 2—3 mm. diam.), sub-epiphyllous, more or less velvety, circular in shape, scattered (never confluent), living on the upper surface of the leaves; mycelium composed of hyphae not densely but regularly branched, chestnut-brown in color, straight, septate, not anastomosed, 6—8 μ diam.; capitate hyphopodia abundant, alternate or opposite, 10—17 by 6—8 μ, with an ovoid to sub-spherical head, uniform in shape,

10—12 μ in diameter, and a very indistinct basal cell; mucronate hyphopodia abundant, more or less acuminate, generally curved, with a small ampulliform base, 15—25 by 6—7,5 μ; mycelial setae abundant, black, opaque, rigid, branched, 80—150 μ long, 5,5—7,5 μ thick, dichotomously (rarely trichotomously) branched, these branches with dichotomous branches of second order: free ends acuminate or obtuse, straight to uncinate; branches of the first order not more than 32 μ in length, and branches of second order from 4 to 10 μ in length; perithecial setae similar to the mycelial; perithecia not abundant, spherical, slightly depressed, black, opaque, 110—165 μ diam.; asci diffluent; spores dark-brown in color, 4-septate, narrowed at the septa, with more or less rounded ends, 26—38 by 12—18 μ; paraphysoides indistinct.

On *Swietenia mahagoni* (L.) Jacq., Valle del Cibao, prov. La Vega. Cotuí, hillside, 18. IV. 1930. Coll. R. Ciferri & E. L. Ekman.

The formula of this infrequent but interesting species is: 3333. 3221. the formula of the Meliola found on other Meliaceae being 3111., or 3112., or 3113., but not 3333. The double dichotomous ramification of the setae is very characteristic. This is the first Meliolinea found on *Swietenia*.

No. 194. — *M. stenotaphri* Stev., Ill. Biol. Mon., Vol. II, p. 41 (1916).

On *Stenotaphrum secundatum* (Walt.) OK., Valle del Cibao, prov. Espaillat, Moca, road to La Vega, at La Soledad, 28. III. 1931. — Porto Rico.

First record outside Porto Rico.

No. 43 bis. — *M. seminata* B. et C., Journ. Linn. Soc., Vol. X, p. 392 (1868).

On *Psychotria Berteriana* P. DC., as no. 185, Hatillo, road to Mao, hillside, 3. III. 1931. — Argentine, Cuba, Porto Rico.

No. 143. — **Meliola capilligera** Cif., n. sp. (Part of the type specimen).

Black, velvety, clearly delimited, epiphyllous, circular spots, 1—2 mm. diameter when isolated, but frequently joined in larger spots; mycelium almost completely hidden under the setae, composed of dark-brown, septate, sparsely and irregularly branched hyphae, 8—10 μ thick; capitate hyphopodia joined or scattered, normally opposite, rarely alternate, 2- or 3- or irregularly-lobate, sub-spherical to irregularly ellipsoid, 16—20 μ diam., or 18—20 by 12—16 μ; mucronate hyphopodia not seen; mycelial setae very abundant, straight to more or less curved, rarely sub-uncinate, black, opaque, lighter at the obtuse free end, 160—350 μ in length, 10—14 μ in thickness: perithecia spherical, black, with a slightly sinuate border, 180—230 μ diam.; asci diffluent; spores 4-septate, dark-brown to blackish, smoky, cylindrical or elliptical with rounded ends, slightly narrowed at the septa, 40—46 by 18—22 μ.

On living leaves of *Guajacum sanctum* L., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, in thickets, 31. XII. 1930. Collected E. L. Ekman.

This species, not very frequent, is found both on *Guajacum sanctum* and *G. officinale* L. The formula, following Stevens' key, is: 3413. 4332. It is very characteristic on account of the abundance, rather variable, of the setae. On the members of the family of Zygophyllaceae two species are known, both on *Guajacum: M. Woodiana* Sacc., typically found on Rubiaceae, and *M. araliae* Spreng., typically found on Araliaceae. both different from the present species. On *Guajacum* in the Dominican Republic Toro recorded *M. Woodiana.*

No. 200. — *M. thouiniae* Earle, Bull. N. York Bot. Gard., Vol. III. p. 308 (1916).

On *Thouinia trifoliata* Poir., as no. 121, hillside, at Río Jaina, 30. VI. 1926. — Porto Rico.

No. 200 bis. — On *Krugiodendron ferreum* (Vahl) Urb., as no. 185, in thickets, 26. XII. 1930. Coll. R. Ciferri & E. L. Ekman.

First record outside the type locality (Porto Rico). This species is not frequent on either host plant. The species in question was typically found on Sapindaceae, but we leave the *Meliola* on *Krugiodendron* (Rhamnaceae) under *M. thouiniae,* where it was originally placed, though it may be specifically distinct from the same.

No. 144. — **M. canellae** Cif., n. sp. (Part of the type specimen).

Epiphyllous, black, velvety to opaque, irregular, small colonies, from 0.5 to 3 mm. diameter, generally not more than 2 mm., scattered or confluent, aggregated, both on the upper and lower surfaces, but most frequent on the upper surface of the leaves; capitate hyphopodia regularly ovate or obovate in shape, very rarely cylindrical, opposite, less frequently unilateral or alternate, brown-blackish, with a distinct basal cell, 12—15 by 6—8 μ, basal cell 2—4 μ in length: mycelium loosely aggregated, composed of brown septate hyphae not frequently anastomosed, branched following an acute angle, 4—6 μ thick: mucronate hyphopodia very scarce, with a broader basal part and a narrower apical part, generally curved to sub-uncinate, 18—22 μ in length, 4—6 μ broad at the basal portion, 2—3,5 μ at the apical portion: mycelial setae not very abundant, black, opaque, straight, more or less smooth, acuminate, from 250 to 740 μ in length, 8—13 μ broad; perithecial setae shorter but similar to the preceding: perithecia not frequent, flattened, with or without a developed basal disc, 300 to 400 μ diam.: asci diffluent, generally containing 3 spores: spores regularly elliptical, with rounded ends, evidently narrowed to the septa, 37—40 by 15—17 μ; paraphysoides mucose, not clearly differentiated.

On *Canella Winterana* (L.) Gärtn. [*C. alba* Murr.], Cordillera Septentrional, prov. Puerto Plata, Sosúa, coastal forest, 20. III. 1930. Coll. E. L. Ekman. — Porto Rico.

This species, whose formula is: 3113. 3224, is surely similar to *M. thouiniae* Earle (formula: 3113. 3222), but it differs in many charac-

teristics, morphological as well as biometrical. In Porto Rico the fungus on *Canella* was recorded under *M. thouiniae.*

No. 187. — **M. paralabatiae** Cif., n. sp. (Part of the type specimen).

Black, diffuse, epiphyllous spots, from 1 to 5 mm, diam., irregular in shape, generally confluent into larger spots, found on the upper surface of the leaf; mycelium brown, irregularly branched, septate, tortuose, composed of hyphae irregularly disposed, frequently anastomosed, forming a dense net-like layer, 6,5—9 μ thick; capitate hyphopodia scarce, far apart, more or less spherical, alternate or unilateral, without a distinct basal cell, 9—13 μ diam.; mucronate hyphopodia not seen; without mycelial or perithecial setae; perithecia black, depressed, not very regular in shape, 160—200 μ diam.; asci diffluent, 2—4-spored; spores ovoid, elliptical to sub-cylindrical, with more or less rounded ends, 4-septate, light-brown to brown-blackish, 28—32 by 11—13 μ.

On *Paralabatia Fuertesii* Urb., Cordillera Central, prov. La Vega, Bonao, Sabana del Puerto, moist forests, 14. IX. 1928. Coll. R. Ciferri.

This is the first glabrous *Meliola* (genus *Irenina* acc. Stevens) described on members of the family of Sapotaceae, and the first Meliolinea found in the genus *Paralabatia.*

No. 77. — *Dothichloe aristidae* Atk., Bull. Torrey Club, Vol. XXI, p. 24 (1894).

On *Aristida refracta* Griseb., Cordillera Central, prov. Monte Cristy, Monción, pineland, 25. V. 1929. Coll. R. Ciferri & E. L. Ekman. — Southern U. S. A., Porto Rico.

Known only from a single collection in Santo Domingo; recorded in Porto Rico on *Aristida portoricensis* Pilg. The host plant is new to the species, and the species is new to Santo Domingo.

No. 172. — *Mycosphaerella danaeae* Petr. et Cif., Annal. Mycol., Vol. XXVIII, p. 390 (1930) (Part of the type specimen).

On *Danaea nodosa,* Cordillera Central, prov. Azua, San Juan de la Maguana, Loma La Viuda, ca. 1700 m., 18. VIII. 1929. Det. F. Petrak. — Endemic.

Only a single record in Santo Domingo.

No. 115. — *Microsphaera diffusa* Cke. et Peck, Journ. Bot., Vol. X, p. 13 (1872).

On *Crotalaria retusa* L., Vale del Cibao, prov. Santiago, Santiago, Cuesta de Piedra, ca. 300 m., 23. XI. 1930. Col. R. Ciferri, A. M. Borgna Ciferri & E. L. Ekman. — North America, West Indies.

The specific determination, according to Seaver and Chardon (Scient. Survey Porto Rico Virg. Isl., Vol. VIII [1], p. 27, 1926), is somewhat doubtful, as the tropical Oidia only rarely develop the ascogenous stage.

No. 154. — *Phyllachora galactiae* Earle, in Seaver, in Britton, Bahama Fl., p. 633 (1920).

On *Galactia striata* (Jacq.) Urb., Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, in fields, 17. X. 1929. — Bahamas Isl., Porto Rico.

Not rare in Santo Domingo, but scarce and poorly developed.

No. 136. — *Toroa dimerosporioides* (Speg.) Syd., in Toro, Journ. Dept. Agr. Porto Rico, Vol. X, p. 20 (1926).

On *Bromelia pinguin* L. (Cult.), Vale del Cibao, prov. Santiago, Santiago, Hato del Yaque, in fields, 7. III. 1921. — Argentine, Porto Rico.

Very common on *Bromelia pinguin* cultivated in moist places, but rarer on *B. Karatas* L.

No. 134. — **Ustilago Hieronymi** Schroet. var. **insularis** Cif., n. var. (Part of the type specimen).

Spores morphologically similar to those of *U. Hieronymi*, but 14 to 20 μ in diameter, more frequently 17 μ.

On culms, leaves and leaf-sheaths of *Bouteloua heterostega* (Trin.) Griff., Cordillera Septentrional, prov. Santiago, Santiago, Cuesta de Piedra, hillside, 17. XII. 1930, and 15. III. 1931. Coll. E. L. Ekman, p. p. & R. Ciferri p. p.

This variety differs from the type in the size of the spores. A more detailed study of smuts living on species of the genus *Bouteloua* will shortly be published. Known from two collections made in the same locality.

No. 128. — *Mykosyrinx cissi* (DC.) G. Beck, Ann. Nat. Hofmus. Wien. IX, p. 228 (1894).

On *Cissus sycioides* L., Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, at El Caimito, 16. VII. 1930. — Africa, Central and South America, Southern U. S. A., West Indies.

Rather common on this host plant.

No. 125. — *Burrillia echinodori* Clint., Journ. Mycol., Vol. VIII, p. 154 (1902).

On *Echinodorus cordifolius* (L.) Griseb., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, at Río Yaque, 6. XI. 1930 and 23. XII. 1930. Coll. R. Ciferri and E. L. Ekman. — Porto Rico, Southern U. S. A.

This rare smut, found only as poor specimens, is new to Santo Domingo.

No. 112. — *Coleosporium elephantopodis* (Schw.) Thüm., Myc. Univ., No. 953 (1878).

On *Elephantopus mollis* H. B. K., Cordillera Central, prov. La Vega, Bonao, at Río Maymón, 17. XII. 1930. Coll. R. Ciferri & E. L. Ekman. — Central and South America, Southern U. S. A., West Indies.

Common throughout Santo Domingo, in moist open regions.

No. 149. — *C. eupatorii* Arth., Bull. Torrey Bot. Club, Vol. XXXIII, p. 31 (1906).

On *Eupatorium macrophyllum* L. [*Hebeclinium macrophyllum* (L.) DC.], Cordillera Septentrional, prov. Santiago, Santiago, El Cerrazo, ca.

m. 850, 20. II. 1930. Coll. E. L. Ekman. — Central America, Cuba, Porto Rico.

An uncommon species, new to Santo Domingo.

No. 102. — *C. ipomoeae* (Schw.) Burr., Bull. Ill. Lab. Nat. Hist., Vol. II, p. 217 (1885).

On *Ipomoea Batatas* (L.) Lam. (Cult.), Cordillera Septentrional, prov. Santiago, Santiago, Loma Diego de Ocampo, in fields, ca. 900 m., 3. XII. 1930. Coll. E. L. Ekman. — Central and South America, Jamaica, Porto Rico, Southern U. S. A.

No. 102 bis. — On *Ipomoea Nil* (L.) Roth., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, in fields, 23. XII. 1930. Coll. E. L. Ekman.

Common on *I. Batatas,* rather common on *I. Nil.*

No. 181. — *Phakopsora aeschynomenis* Arth., Bull. Torrey Bot. Club, Vol. XLIV, p. 500 (1919).

On *Aeschynomene americana* L., Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, in fields, 17. V. 1930. — Central and South America, Cuba, Porto Rico.

Not very common. First record for Santo Domingo of this species.

No. 146. — *P. tecta* Jacks. et Holw., in Jacks., Mycologia, Vol. XVIII, p. 148 (1926).

On *Commelina nudiflora* Auct. non L. [*C. longicaulis* Jacq.], Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, at Río Yaque, 17. XII. 1930. Coll. E. L. Ekman & R. Ciferri. — South Africa, South America, Welt Indies.

New species to Santo Domingo, and here apparently very rare.

No. 179. — *Olivea capituliformis* (P. Henn.) Arth., Mycologia, Vol. IX, p. 61 (1917).

On *Alchornea latifolia* Sw., Cordillera Central, prov. La Vega, Bonao, Sabana del Puerto, 5. IV. 1930. — Brazil, Porto Rico, Tortola.

Not rare, but easily overlooked.

No. 158. — *Botryorhiza hippocrateae* Whetz. et Ol., Am. Journ. Bot., Vol. IV, p. 47 (1917).

On *Hippocratea volubilis* L., Cordillera Central, prov. La Vega, Bonao. road to La Cumbre, roadside, 22. VI. 1928. — Porto Rico.

A rather common species, localized in Porto Rico and Santo Domingo only.

No. 109. — *Ravenelia caesalpiniae* Arth., Bull. Torrey Club, Vol. XXXI, p. 5 (1904).

On *Mimosa Ceratonia* L., Cordillera Central, prov. La Vega, Bonao, at Río Maimón, 17. XII. 1930. — Porto Rico, St. Thomas, Vieques.

Very common.

No. 123. — *R. indigoferae* Tranz., Hedwigia, Vol. XXXIII, p. 369 (1894).

On *Indigofera mucronata* Spreng., Valle del Cibao, prov. Santiago,

Tamboril, in fields, 22. II. 1931. — Bermuda, Cuba, Jamaica, Mexico, South America.

Very common on this host plant.

No. 124. — *Pucciniosira pallidula* (Speg.) Lagerh., Tromsö Mus. Aarsh., Vol. XVI, p. 122 (1894).

On *Triumfetta semitriloba* Jacq., Valle del Cibao, prov. Santiago, Tamboril, in fields, 22. II. 1931. — Central and South America, West Indies.

A rather frequent rust.

No. 186. — *Prospodium appendiculatum* (Wint.) Arth., Journ. Mycol., Vol. XIII, p. 31 (1907).

On *Stenolobium stans* Seem. [*Tecoma stans* (L.) H. B. K.] (Cult.), Valle del Cibao, prov. Espaillat, Moca, road to La Vega, in a garden, 28. III. 1931. Coll. R. Ciferri & E. Ciferri. — Central and South America, West Indies.

First record of this species in Santo Domingo.

No. 180. — *Pucciniastrum agrimoniae* (Schw.) Tranz., Scripta Bot. Hort. Univ. Petrop., Vol. IV, p. 301 (1895).

On *Agrimonia parviflora* Ait. [*A. polyphylla* Tub.], Cordillera Central, prov. La Vega, Valle del Yaque, ca. 1500 m., 5. X. 1929. Coll. E. L. Ekman. — North and South America, Asia, Europe.

Only one record of this rare rust, distributed under the generic name *Uredo*.

No. 167. — *Uromyces columbianus* Mayor, Mém. Soc. Neuch. Sc. Nat., Vol. V, p. 467 (1913).

On *Melanthera Buchii* Urb., Llano Costero, prov. Santo Domingo, Los Alcarrizos, roadside, 9. XII. 1925. — Central and South America, West Indies.

Common on this host plant.

No. 168. — *U. janiphae* (Wint.) Arth., Mycologia, Vol. VII, p. 190 (1915).

On *Manihot domingensis* Urb. et Ekm., n. sp. ad interim, Península de Samaná, prov. Samaná, Samaná, El Valle, 16. V. 1930. Coll. E. L. Ekman. — Tropical America.

New host plant for this species, previously found in Santo Domingo on *Manihot esculenta* Crantz only in wet regions.

No. 122. — *Puccinia Arechavaletae* Speg., An. Soc. Ci. Argent., Vol. XII, p. 67 (1881).

On *Serjania polyphylla* (L.) Radlk., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, hillside, 9. III. 1931. — South America, Southern U. S. A., West Indies.

Previously known in Santo Domingo on *Cardiospermum microcarpum* H. B. K., the host plant is new to this rust, apparently localized in certain regions, and rather rare.

No. 18 bis. — *P. cannae* (Wint.) P. Henn., Hedwigia, Vol. XLI, p. 105 (1902).

On *Canna coccinea* Mill., Península de Samaná, prov. Samaná, Sanchez, El Límón, Río Yuna, 6. VII. 1930. Coll. E. L. Ekman. — Central America, West Indies.

See No. 18 (first cent.). Apparently rare on this host plant.

No. 110. — *P. cacabata* Arth. et Holw., Proc. Amer. Philos. Soc.. Vol. LXIV, p. 179 (1925).

On *Chloris ciliata* Sw., as no. 122, 24. XII. 1930. Coll. E. L. Ekman & R. Ciferri.

Apparently rare in Santo Domingo.

No. 129. — *P. cenchri* Diet. et Holw., in Holw., Bot. Gazette, Vol. XXIV, p. 28 (1897).

On *Cenchrus viridis* Spreng., as no. 122, in fields, 3. III. 1930. — Central and South America, West Indies.

No. 129 bis. — On *Cenchrus echinatus* L., as no. 122, in fields, 27. XII. 1931. Coll. R. Ciferri & E. L. Ekman.

A common rust.

No. 105. — *P. chaetochloae* Arth., Bull. Torrey Club, Vol. XXXIV. p. 585 (1907).

On *Paspalum arundinaceum* Poit., as no. 122, near Río Yaque, 1. XII. 1930. Coll. E. L. Ekman. — Cuba, Jamaica, Porto Rico. Southern U. S. A.

New host plant for the species.

No. 135. — *P. cyperi-tagetiformis* (P. Henn.) Kern, Mycologia, Vol. XI, p. 138 (1919).

On *Cyperus radiatus* Vahl, Península de Samaná, prov. Samaná, Matanzas, at Río Boba, 8. VIII. 1930. Coll. E. L. Ekman. — Asia, Porto Rico, Southern U. S. A.

New species to Santo Domingo, but previously found in Porto Rico on the same host plant.

No. 117. — *P. fuirenicola* Arth., Bull. Torrey Club, Vol. XLVI, p. 100 (1919).

On *Fuirena umbellata* Rottb., as no. 122, Las Lagunas, Pozo Hediondo. 7. XII. 1930. Coll. E. L. Ekman & R. Ciferri. — Cuba, Porto Rico. South America, India.

A rather common species, new to Santo Domingo.

No. 49 bis. — *P. heterospora* Berk. et Curt., in Berk., Journ. Linn. Soc., Vol. X, p. 356 (1869).

On *Sida procumbens* Sw., as no. 122, in fields, 24. XII. 1930. Coll. R. Ciferri & E. L. Ekman. — All the world.

No. 49 ter. — On *Sida* sp. (aff. *S. procumbens* Sw.), as no. 122, Hatillo. road to Mao, in fields, 7. III. 1931.

The rust on *Sida procumbens* is quite rare, and this host plant is new to Santo Domingo.

No. 130. — *P. lateritia* Berk. et Curt., Journ. Phil. Acad. Sc., Vol. II, p. 281 (1853).

On *Spermacoce tenuior* L., as no. 122, in fields, 13. XII. 1930. — Central and South America, Southern U.S.A., West Indies.

Not rare on this host plant, new to Santo Domingo.

No. 164. — *P. leptochloae* Arth. et Fromme, Torreya, XV, p. 263 (1915).

On *Leptochloa virgata* (L.) Beauv., Cordillera Septentrional, prov. Puerto Plata, Puerto Plata, in fields, 18. III. 1930. Coll. E. L. Ekman.

Apparently very rare. The species is new to Santo Domingo, and the host plant is new to the species.

No. 175. — *P. leucadis* Syd. in Monogr. Ured. I, p. 281.

On *Leucas martinicensis* (Jacq.) R. Br., as no. 122, in fields, 6. III. 1931. Conf. F. D. Kern. — Africa.

A new species to the New World, allied to, if not identical with, *Puccinia leonotidis* (P. Henn.) Arth.

No. 107. — *P. liberta* Kern, Mycologia, Vol. XI, p. 142 (1919).

On *Heleocharis cellulosa* Torr., as no. 122, Las Lagunas, Pozo Hedi-ondo, 7. XII. 1930. Coll. R. Ciferri & E. L. Ekman. — Central America, Porto Rico, Southern U.S.A.

No. 107 bis. — On *Heleocharis* sp. (aff. *H. cellulosa* Torr., but probably a new species), Península de Samaná, prov. Samaná, Sabana de la Mar, 10. VII. 1930. Coll. E. L. Ekman.

New species to Santo Domingo, frequently associated with *Uredo incomposita* Kern.

No. 33 bis. — *P. melampodii* Diet. et Holw., in Holw., Botan. Gazette, Vol. XXIV, p. 32 (1897).

On *Eleutheranthera ruderalis* (Sw.) Sch. — Bip., as no. 122, in fields, 14. XI. 1930. Coll. E. L. Ekman & R. Ciferri. — Central America, Southern U.S.A., West Indies.

Common on this host plant.

No. 127. — *P. purpurea* Cooke, Grevillea, Vol. V, p. 15 (1876).

On *Holcus halepensis* L., as no. 122, irrigation ditches, 26. II. 1931. — All over the world.

No. 127 bis. — On *Holcus Sorghum* L. (cult.), Valle del Cibao, prov. Espaillat, Moca, at La Rosa, 2. I. 1930.

A common species on both host plants.

No. 195. — *P. ruelliae* (B. et Br.) Lagerh., Tromsö Mus. Aarsh., Vol. XVII, p. 71 (1895).

On *Ruellia domingensis* Spreng., Cordillera Septentrional, prov. Puerto Plata, Puerto Plata, road to Santiago, hillsides, 19. IV. 1931. — Central America, West Indies.

The species is new to Santo Domingo, and the host plant is new to the species.

No. 120. — *P. scirpi* DC., Fl. Franç., Vol. II, p. 223 (1805).

On *Scirpus validus* (Vahl) Kük. (*S. lacustris* Auct., not L.), as no. 117. Coll. R. Ciferri & E. L. Ekman. — Bermuda, Cuba, Porto Rico, Europe.

No. 120 bis. — On *Scirpus,* sp., as no. 122, Quinigua, at Río Yaque, 26. III. 1931.

A very rare rust, new to Santo Domingo.

No. 183. — *P. tageticola* Diet. et Holw., in Holw., Botan. Gazette. Vol. XXIV, p. 26 (1897).

On *Tagetes patula* L. (Cult.), Valle del Cibao, prov. Santiago, Santiago, in a garden, 7. III. 1931. — Central and South America, Porto Rico.

Not uncommon, but not previously found in Santo Domingo.

No. 74 bis. — *P. tubulosa* (Pat. et Gaill.) Arth., Amer. Journ. Bot., Vol. V, p. 464 (1918).

On *Paspalum conjugatum* Berg., Cordillera Central, prov. La Vega. Bonao, at Río Maymón, 17. XII. 1930. — Central and South America, Asia, Cuba, Porto Rico.

A very common rust.

No. 132. — *P. Urbaniana* P. Henn., Hedwigia, Vol. XXXVII, p. 278 (1898).

On *Stachytarpheta jamaicensis* Vahl [*Valerianoides jamaicensis* (L.) Kuntze, not *V. strigosum* (Vahl) Britt., as by mistake on the label], Valle del Cibao, prov. Santiago, Tamboril, hillsides, 22. II. 1931. — Bahamas. Central and South America, Cuba, Porto Rico, Southern U. S. A.

A frequent species.

No. 66. — *P. lithospermi* Ell. et Kell., Journ. Mycol., Vol. I, p. 2 (1885).

On *Evolvulvus glaber* Spr., as no. 122, in fields, 13. XI. 1930. Coll. R. Ciferri & E. L. Ekman. — Porto Rico, U. S. A., Japan.

Apparently rare. Only one record. The host plant is new to the species.

No. 104. — *Aecidium domingense* Kern et Cif., Mycologia, Vol. XXII, p. 116 (1930).

On *Baccharis myrsinites* (Lam.) Pers., Cordillera Septentrional, prov. Santiago, top of Loma Diego de Ocampo, ca. 1250 m., 4. XII. 1930 (type locality). Coll. E. L. Ekman. — Endemic.

Two collections of this localized species, not rare in the type locality.

No. 140. — *Aecidium cordiae* P. Henn., Engl. Bot. Jahrb. XVII, p. 491 (1893).

On *Cordia globosa* (Jacq.) H. B. K., as no. 122, hillside, 3. III. 1930. — Brazil.

First confirmation of this species, previously doubtfully indicated on *Cordia globosa* (Jacq.) H. B. K. (under *C. bullata* P. DC. or *Varronia bullata* Auct., not L., not *Vernonia bullata*, as by mistake, in my Mycofl. Domingensis, p. 121, 1928). *Cordia urticifolia* is unknown to Santo Domingo; probably an error for *C. ulmifolia* Juss., synonym of *C. corymbosa* (L.) G. Don.

No. 119. — *Uredo guacae* Mayor, Mém. Soc. Neuch. Sc. Nat., Vol. V. p. 503 (1913).

On *Epidendrum difforme* Jacq. [*Amphiglottis difformis* (Jacq.) Britt.]. Península de Samaná, prov. Samaná, Samaná, near Hato Viejo, ca. 275 m., 13. VI. 1930. Coll. E. L. Ekman. — Porto Rico, South America.

Very rare and exceedingly scarce, when found. New species to Santo Domingo.

No. 126. — *U. rubescens* Arth., Mycologia, Vol. VII, p. 327 (1915).

On *Dorstenia* sp., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, at Río Yaque, 17. X. 1930. Coll. E. L. Ekman & R. Ciferri. — Central and South America, Porto Rico, Trinidad.

No. 126 bis. — On *Dorstenia peltata* Spr., Cordillera Septentrional, prov. Puerto Plata, Bajabonico, 18. III. 1930.

No. 126 ter. — On *Dorstenia pseudopeltata* Urb. et Ekm., n. sp. ad interim, as no. 119, Samaná, Rincón, 20. V. 1930. Coll. E. L. Ekman.

A rather rare species, new to Santo Domingo.

No. 196. — *U. sparganophori* P. Henn., Hedwigia, Vol. XLIII, p. 160 (1904).

On *Sparganophorus Vaillantii* Crantz [*Struchium sparganophorum* (L.) Kuntze]. Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, in fields, 16. IV. 1930. Coll. E. L. Ekman & R. Ciferri. — Cuba, Jamaica, Porto Rico, South America.

Apparently very rare, as recorded only in one collection. New species to Santo Domingo.

No. 193. — *U. Toroiana* Kern. Mycologia, Vol. XX, p. 76 (1928).

On *Vernonia cinerea* (L.) Less., as no. 196, in fields, 14. I. 1930; 13. III. 1930; 25. IV. 1930; and 15. V. 1930. Coll. R. Ciferri, p. p. and R. Ciferri & E. L. Ekman. — Endemic.

Not rare, but always scarce and, when found, only collected in poor specimens.

No. 170. — *Phomopsis caryotae-urentis* Petr. et Cif., Annal. Mycol., Vol. XXVIII, p. 413 (1930) (Part of the type specimen).

On *Caryota urens* L. (Cult.), Valle del Cibao, prov. Santiago, Mao, in a garden, 13. V. 1929. Det. F. Petrak. — Endemic.

Only one record of this species.

No. 106. — *Septoria Ciferriana* Petr., in Petr. & Cif., Annal. Mycol., Vol. XXVIII, p. 417 (1930) (Part of the type specimen).

On *Sideroxylon foetidissimum* Jacq., Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, 6. V. 1929. Det. F. Petrak. Endemic.

Not rare, but frequently not well developed.

No. 171. — *Asteromella coccothrinacis* Petr. et Cif., Annal. Mycol., Vol. XXVIII, p. 404 (1930) (Part of the type specimen).

On *Coccothrinax argentea* (Lodd.) Sarg., Cordillera Central, prov. Santiago, Monción, palm barren, 25. V. 1929. Det. F. Petrak. — Endemic.

A single record of this species.

No. 113. — *Pestalozzia mangiferae* P. Henn., Flore du Bas- et Moyen-Congo, Ann. Mus. du Congo, Vol. II, fasc. 2, p. 102 (1907).

On *Mangifera indica* L. (Cult.), Cordillera Septentrional, prov. Espaillat, Moca, Jamao, Colonia, 6. V. 1929. Det. F. Petrak. Congo.

Frequent on dead leaves of the mango tree.

No. 98. — *Cercospora plucheae* Petr. et Cif., Annal. Mycol., Vol. XXVIII, p. 419 (1930).

On *Pluchea purpurascens* (Sw.) DC., Valle del Cibao, prov. Santiago, Santiago, Palmarejo, 21. XI. 1930. Coll. E. L. Ekman & R. Ciferri. — Endemic.

Not rare during the spring rainy seasons.

No. 147. — *Cercospora achyranthis* Syd., Annal. Mycol. VII, p. 171 (1909).

On *Achyranthes indica* Mill., Valle del Cibao, prov. Santiago, Santiago, roadside, 22. XII. 1930.

This specific determination is not certain, as the fungus on *Achyranthes indica* (new host plant for the species) was not compared with the fungus on *A. aspera* L., type host plant. This species is apparently rare, and new to Santo Domingo.

No. 137. — *C. atricincta* Heald et Wolf, Mycologia, Vol. III, p. 14 (1911).

On *Zinnia elegans* L. [*Crassina elegans* (Jacq.) Kuntze] (Cult.), as no. 147, Hato del Yaque, in a garden, 16. II. 1931. Coll. A. M. Borgna Ciferri & R. Ciferri. — North America and West Indies.

A very common species.

No. 160. — *C. hurae* Stev., Trans. Ill. Ac. Sci., Vol. X, p. 210 (1917).

On *Hura crepitans* L., as no. 137, at Río Yaque, 12. III. 1931. — Porto Rico.

This species was found only in Porto Rico on the same host plant. It appears to be common. The spots are from circular to irregular, only rarely angular as limited by the veins, and smaller (1—3 mm. diameter instead of 20 by 4—10 mm.), whitish in the center (not grayish), black- or brown-bordered (not purplish), and without concentric lines marking the dead leaf tissue. The conidia are linear to elongate clavate, with the free end from obtuse to acute, sub hyaline, without septa or with 1 to 5 septa, generally from 2 to 4, unequally distributed, 2 or 3 near the free end, and 1 at the base. They are from 30 to 80 μ in length, and from 3 to 8 μ width. From the short description of Stevens, the Dominican *Cercospora* appears to be different, but a comparison with Porto Rican material would be necessary for a right judgement.

No. 114. — *C. portoricensis* Earle, Muhlenbergia, Vol. I, p. 15 (1901).

On *Potomorphe peltata* (L.) Miq. [*Piper peltatum* L.], Valle del Cibao, prov. Espaillat, Moca, Estación Nacional Agronomica, at Arroyo El Caimito, 1. XII. 1929. — Porto Rico.

Very common on this host plant as well as on *Potomorphe umbellata* (L.) Miq. and species of the genus *Piper*.

No. 100 bis. — *Cercospora trichophila* Stev., Trans. Ill. Acad. Sci., Vol. X, p. 212 (1917).

On *Solanum verbascifolium* L., as no. 160, in thickets, 30. XII. 1930. — Porto Rico.

This species is rarer on this host plant than on *Solanum torvum*.

No. 141. — *Fumago vagans* Pers., Mycol. Europ., Vol. I, p. 9 (1822).

On *Cassia* sp., Valle del Cibao, prov. Santiago, Tamboril, roadside, 22. II. 1931. — All over the world.

This determination is conventional only.

No. 142. — *Helminthosporium Ravenelii* Curt., in Berk., Grevillea, Vol. III, p. 102 (1874).

On *Sporobolus Berteroanus* (Trin.) Hitchc., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, in fields, 17. VIII. 1930. — Bermuda, Cuba, North America, Porto Rico.

Very frequent on *Sporobolus indicus* (L.) R. Br., this species is rarer on *S. Berteroanus*, and very rare on *S. argutus* (Nees) Kunth.

No. 138. — *Camptomeris leucaenae* (Stev. et Dalb.) Syd., Annal. Mycol., Vol. XXVIII, p. 222 (1930).

On *Leucaena glauca* (L.) Benth., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, in fields, 30. XII. 1930, and 6. II. 1931, Coll. E. L. Ekman, p. p. & R. Ciferri, p. p. — Porto Rico, Venezuela.

First record for Santo Domingo.

No. 156. — **Camptomeris desmanthi** Cif., n. sp. (Part of the type specimen).

Dull brown to blackish, circular to irregular colonies, not maculicolous, or producing a small, very indistinct, yellow greenish halo, gregarious but never confluent, single, punctiform to the naked eye, 0.15 to 0.25 mm. in diameter or in length, generally 0.15 to 0.20 mm., in groups composed of 5 to 20 single colonies, most frequently 5 to 12; intramatrical mycelium composed of sub hyaline to yellowish, branched, septate hyphae; basal stroma sub epidermal to sub cuticular, more or less inconspicuous, composed of tangled, not very distinct, branched and anastomosed, septate hyphae, 30 μ or less thick; conidiophores generally unicellular, with a cylindrical to inflated base, olive brown to dull brown, 25 — 48 by 8 — 13 μ; conidia acrogenous, single on each conidiophore, normally cylindrical, rarely irregularly elliptical, with the free end well rounded, basal end cut at the insertion point, straight or very slightly curved, but never falcate or fusiform, sub hyaline, smoky or olive yellowish, most frequently

yellowish, continuous or 1-septate, exceptionally 2- or 3-septate, 30—52 by 8—13 μ, normally 35—40 by 9—11 μ.

On *Desmanthus virgatus* (L.) Willd., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, in fields, 31. XII. 1930. Coll. E. L. Ekman & R. Ciferri.

This species is, at least in part, intermediate between the type species of the genus (*C. calliandrae* Syd., on *Calliandra*), and *C. leucaenae* (Stev. & Dalb.) Syd. (on *Leucaena*) by the stroma being poorly developed and by the commonly continuous to 1-septate conidia. A characteristic feature of the species are the very small, aggregate but single colonies of the fungus. This species is rarer than *C. leucaenae,* found in the same locality, but apparently specialized on *Leucaena.*

No. 157. — **Cerebella paspali** Cke. et Thuem., var. **panici** Cif., n. var. (Part of the type specimen).

Only a few ovaries (1 to 5) in each inflorescence are parasitized: parasitized ovaries elliptic or ovate or irregular in shape, rarely subspherical, always acuminate at the free end, 1,5—4 by 3—7 mm.; conidia spherical if single, generally simulating the aggregation of 2 to 4 conidia, normally 3, by one transverse and one longitudinal septum; the septa are disposed irregularly, rarely completely crossed; they are yellowish-brown to olive-brown, 7—12 by 9—16 μ in size.

On *Setaria setosa* Beauv., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, in fields, 20. III. 1931. Coll. R. Ciferri.

The shape and size of the conidia, as well as the apparently very nice aggregation in pairs, in triads and in tetrads, easily distinguishes the variety from the species. A more thorough comparative investigation will probably show a specific distinction, related with a probable host specialization. This variety is apparently uncommon, and very localized.

No. 103. — *Cladosporium guanicensis* Stev., Trans. Ill. Ac. Sci., Vol. X, p. 207 (1917).

On *Argemone mexicana* L., Valle de San Juan, prov. Azua, San Juan de la Maguana, town, 16. VIII. 1929. — Porto Rico.

The generic determination of this Hyphomycete is very doubtful. In our specimens, the spots are nearly circular, more or less confluent, generally arranged in rows parallel to the midrib, 4 to 10 mm. in diam., sometimes fused in larger patches (as seen on the upper surface of the leaves). The center of the spot is, normally, gray in color, with a blackish 2—3 mm. wide, well defined border; on the lower surface, the spots are uniformly blackish. The clusters are very small, widely scattered, white to whitish, then grayish and inconspicuous. The conidiophores are hyaline, not branched, erect or sub-erect, sparsely septate, variable in size. The conidia are acrogenous, hyaline, elongate, from cylindric-acuminate to needle-shaped, as a rule continuous, rarely from 1 to 2 septate, 18—22 μ, rarely 30 μ in length, 2—3 μ broad. These characters are not coinci-

dent with those indicated in Stevens' diagnosis of *Cladosporium guanicensis*, nor with those of *Cercospora Whetzelii* Chupp (in Toro, Journ. Dept. Agr. Porto Rico, Vol. XV, p. 16, 1931), found in Porto Rico on the same host plant. So far, this determination is only temporary, and subject to change when comparison with authentic specimens of *Cladosporium* and *Cercospora* is possible, and *Ramularia* would be the best generic position at present. In my opinion, the Dominican specimens should be regarded as a previously undescribed species. Only seen at San Juan de la Maguana, in spite of the fact that the host plant is common in semiarid or mesophytic districts of the Dominican Republic.

No. 23 bis. — *Oidium erysiphoides* Fries f. *zinniae* Cif., Annal. Mycol., Vol. XXIX, p. 292 (1931).

On *Zinnia multiflora* L., Valle del Cibao, prov. Santiago, Santiago, Hato del Yaque, at Río Yaque, 12. III. 1931. — Santo Domingo.

See no. 23 of the first cent. Rarer than the same form on *Zinnia elegans*.

No. 139. — *O. erysiphoides* Fries f. *cassiae* Sacc., Annal. Mycol., Vol. VIII, p. 339 (1910).

On *Cassia uniflora* Mill. [*C. sericea* Sw.], as no. 23 bis, in fields, 2. III. 1931. — Africa.

This form was found in Africa on *Cassia occidentalis* L., a host plant never parasitized by the *Oidium* in Santo Domingo, while *C. uniflora* is very frequently attacked. This *Oidium* may be of the cycle of *Erysiphe polygoni* DC.

No. 145. — **O. erysiphoides** Fries f. **ingae** Cif., n. f. (Part of the type specimen).

On *Inga vera* Willd. [*Inga inga* (L.) Britt.], as no. 23 bis, 12. III. 1931.

An apparently very rare host form of *Oidium erysiphoides*, very distinct from *Septoidium Stevensii* Arn., found on *Inga laurina* (Sw.) Willd.

No. 174. — **O. erysiphoides** Fries f. **wissadulae** Cif., n. f. (Part of the type specimen).

On *Wissadula hernandioides* (l'Hér.) Garcke, as no. 23 bis, in fields, 25. XII. 1930. Coll. R. Ciferri & E. L. Ekman.

A matrical, rare form, of which I do not know the ascophorous fructification.

Graphidineen von Celebes und Java.

Von Dr. Karl Redinger, Wien.

(Mit Tafel V.)

Von dem Flechtenmaterial, das G. Kjellberg (Tullinge) in den Jahren 1929 und 1930 auf Celebes und Java gesammelt hat, gelangen hier die Graphidaceen im engeren Sinne, nebst einem *Arthothelium* und einer *Sarcographa*, zusammen 14 Arten, zur Veröffentlichung. Darunter sind 5 Arten neu für die Wissenschaft.

Da dies das erste Mal ist, daß Flechten von der Insel Celebes beschrieben werden, dürfte durch den vorliegenden bescheidenen Anfang größeres Interesse auch an den anderen Gruppen dieser Flechtenkollektion geweckt werden, die sicher noch viel Neues und Wertvolles enthält.

Auf Grund einer einzigen Familie läßt sich natürlich noch keine bestimmte Aussage über die Zugehörigkeit des Sammelgebietes zu einem Florenbezirk machen. Immerhin sind Beziehungen zwischen den auf Celebes vorkommenden Arten und den durch E. A. Vainio von den Philippinen bekanntgewordenen unverkennbar. Während aber die Flechtenflora dieser letzteren Inselgruppe durch mehrere große Aufsammlungen verhältnismäßig gut bekannt ist, und auch von Java namentlich in den letzten Jahren ziemlich reiches Material zur Bearbeitung gelangte, konnten von den übrigen Sunda-Inseln bisher nur vereinzelte, kleinere und gelegentlich von Nicht-Lichenologen aufgenommene Flechtenproben studiert werden.

1. Arthothelium spectabile (Fw.) Mass.

A. Zahlbruckner, Catal. lich. univ. II (1924), p. 134.

var. sublirellinum Redgr. nova var.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 30—40 μ altus, effusus, inter lichenes alios maculas minores formans, substrato bene adpressus, membranaceus, laevigato- vel ob substratum ± ruguloso-inaequalis. cinerascenti-albus, opacus, KOH lutescens, sorediis et isidiis destitutus, in margine linea tenuissima, fusco-nigra limitatus. Gonidia dispersa, sat crebra, chroolepoidea, pallide virentia. Medulla sat inspersa, alba.

Apothecia creberrima, dispersa, subimmersa vel adpressa et passim thallum distincte superantia, rotundata, irregulariter lobulata vel hinc inde lirelliformia, usque 1 mm longa et (in sectione transversali) ca. 0,10—0,13 mm alta, superne atra, opaca, epruinosa. Hypothecium indistinctum, angustum, dilute fuscescens. Hymenium superne ca. 20 μ fuligineo-nigrum,

ceterum dilute fuscescens, modice inspersum, ca. 75—100 μ altum, J bene coeruleum. Paraphyses capillari-filiformes, indistinctae, ramosae, connexae et intricatae. Asci late piriformes vel subglobosi, breviter pedicellati, membrana valde incrassata, 6—8 μ lata cincti, ca. 75 μ longi et 33—45 μ lati, 4—8-spori. Sporae bi- vel tri-seriales, oblongo-ellipsoideae, apicibus rotundatis, rectae vel subrectae, decolores, murales, loculis leptodermaticis, subcubicis, in seriebus superpositis 8—11, verticalibus 2—4, 30—42 μ longae et 12—16 μ latae, J vix vel dilute lutescentes.

Conceptacula pycnoconidiorum creberrima, minuta, globosa, ca. 0.1 mm lata, nigra, nitidula; perifulcrum dimidiatum, superne et ad latera fuligineum; fulcra exobasidialia; pycnoconidia bacillaria, recta vel subrecta, 3—4 μ longa et 0,8—1,0 μ lata. — Tab. V, Fig. 1.

Celebes: Moeara Sampara, 0 m s. m., nr. 134 pr. p.

2. Opegrapha (sect. Eu-opegrapha) robusta Vain.

E. A. Vainio, Lichenes in Flora of Koh Chang in Botan. Tidsskr. v. 29 (1909), p. 137, et Lich. Ins. Philipp. in Ann. Acad. Scient. Fenn., ser. A, v. XV/6 (1921), p. 267. — A. Zahlbruckner, Catal. lich. univ. II (1924), p. 241.

Thallus corticola, epiphloeodes, crustaceus, incontinuus vel subdispersus, maculas irregulares, indistincte limitatas et ± confluentes formans, 50—70 μ altus, late expansus, laevis, glaucescens vel virescenti-albidus, opacus, KOH immutatus, sorediis et isidiis nullis, in sectione verticali ex hyphis tenuibus, dissolutis, inspersis, gonidia chroolepoidea, inerebra circumcludentibus formatus, stratum corticale non separatum.

Apothecia crebra, lirellina, sessilia, ad basim abrupta, dispersa, simplicia, raro trifurcata, recta, subrecta vel leviter arcuata, hinc inde undulata, apicibus rotundatis, 1—8 mm longa et 0.25—0.7 mm lata, omnino nuda, nigra, superne bene convexa, laevia, subopaca vel subnitidula, disco rimiformi, impresso, nigro, epruinoso. Excipulum integrum, crasse fuligineum, ad basim planatum, usque 170 μ altum, labiis erectis, fuligineis, integris, abruptis, 90—125 μ latis, nudis, superne angustioribus et arcuatim coniventibus. Hymenium in sectione verticali cordato-rotundatum, decolor, purum, 100—125 μ latum et ca. 150 μ altum, J sanguineum. Paraphyses capillari-filiformes, ramosae et connexae, conglutinatae, eseptatae, non capitatae. Asci ellipsoideo-clavati, membrana sat crassa, 3—4 μ lata cincti, ca. 40—45 μ longi et 15—18 μ crassi, 8-spori. Sporae fasciatim dispositae, aciculares, apicibus acutatis, rectae vel leviter arcuatae, decolores, 20—25-loculares, loculis cubicis, aequalibus, 40—60 μ longae et 3 μ latae, J—. — Tab. V, Fig. 2.

Celebes: Malili, 100 m s. m., nr. 130.

Über die hier gefundenen epigenen Cephalodien soll eine eigene Arbeit demnächst im „Archiv für Mikrobiologie" erscheinen.

3. Graphis (sect. Solenographa) intricata Fée.

A. Fée, Ess. Cryptog. Écorc. Offic. 1824, p. 42, tab. 9, fig. 3. — J. Müller, Graph. Fécan. in Mém. Soc. Phys. et Hist. Nat. Genève, v. 29/8 (1887), p. 30. — A. Zahlbruckner, Catal. lich. univ. II (1924), p. 313.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 50—75 μ altus, continuus, maculas minores, in specimine citato ca. 2 cm latas formans, membranaceus, substratum arcte obducens et cum eo diffractus et desquamescens, laevigato-inaequalis, albus, subopacus,KOH dilute flavescens. sorediis et isidiis destitutus, pars marginalis non visa. Stratum corticale non separatum; medulla alba, dense inspersa, imperspicua; gonidia increbra, dispersa, chroolepoidea.

Apothecia creberrima, lirellina, dense approximata et thallum fere omnino obtegentia, sessilia, ad basim constrictula, simplicia vel rarius trifurcata, sed saepe attingentia et implicata, ut pseudo-ramulosa videantur, arcuata, irregulariter flexuosa et undulata, apicibus rotundatis, 0,7—3,5 mm longa et 0,2—0,3 mm lata, omnino nuda, nigra, subopaca, superne bene convexa, laevia, disco angustissimo, nigro, impresso, epruinoso. Excipulum integrum, fuligineum, ad basim ± subrotundatum, 60—75 μ altum, extrorsum versus non productum, labiis erectis, crassis, fuligineis, integris, omnino nudis, 40—60 μ latis, superne arcuatim coniventibus. Hypothecium indistinctum, angustum, decolor, purum. Hymenium in sectione transversali rotundatum, superne non pulverulentum, decolor, purum, 75—90 (—100) μ altum et aequilatum, J flavens. Paraphyses capillari-filiformes, simplices, strictae, densae, < 1 μ crassae, eseptatae, modice conglutinatae, ad apicem paululum clavatulae. Asci oblongo-clavati, membrana tenui, superne ca. 3 μ crassa cincti, 60—75 μ longi et 10—15 μ lati, 8-spori. Sporae biseriales, oblongae, rectae vel in ascis leviter arcuatae, apicibus angustato-rotundatis, 4—8-loculares, loculis lentiformibus, apicalibus breviter subconicis, decolores, 12—20 μ longae et 4—6 μ latae, J rosaceo-, dein coeruleo-violaceae. — Tab. V, Fig. 3.

Celebes: Moeara Sampara, 0 m s. m., nr. 134 pr. p.

4. Graphis (sect. Solenographa) Kjellbergii Redgr. nova sp.

Thallus corticola, epi- et partim endophloeodes, crustaceus, uniformis, 75—150 μ altus, continuus, sat expansus, substrato bene adpressus, membranaceus, minute ruguloso- vel rimuloso-inaequalis, pallide ochraceus vel cinereo-alutaceus, ± opacus, KOH lutescens vel luteus, sorediis et isidiis destitutus, in margine linea nigra, indistincta, undulata cinctus. Stratum corticale non separatum; gonidia rara, in strato hyphoso et inter cellulas substrati dispersa, chroolepoidea.

Apothecia sat crebra, lirellina, dispersa, sessilia, robusta, ad basim constricta, simplicia vel increbre et irregulariter ramulosa, juvenilia arcuata, mox irregulariter flexuosa et minute undulata, 1—10 mm longa et 0,4—0,5 mm lata, apicibus rotundatis, in parte inferiore strato hyphoso,

cum thallo concolore tenuissime vestita, superne late nuda, bene convexa, nigra, laevia, nitidula, disco angustissimo, impresso, nigro, epruinoso. Excipulum integrum, fuligineum, ad basim planatum, 100—130 μ crassum, extrorsum versus breviter rotundato-productum, labiis erectis, fuligineis, integris, in parte inferiore thallino-vestitis, 80—100 μ latis, superne late nudis, angustatis et arcuatim coniventibus, in toto ca. 350 μ altis. Hypothecium ca. 20 μ altum, subdecolor. Hymenium in sectione transversali cordato-rotundatum, superne haud pulverulentum, ceterum decolor, paululum inspersum, 150—160 μ altum et 110—125 μ latum, J dilute luteseens. Paraphyses filiformes, simplices, strictae, densae, 1.0—1.5 μ crassae, eseptatae, modice conglutinatae, ad apicem non vel paululum latiores. Asci oblongo-clavati, membrana medioeri, superne ad 6 μ incrassata cincti, 120—150 μ longi et 15—30 μ lati, contentu plasmatico J sanguineo, 4-spori. Sporae fasciatim dispositae, cylindricae, apicibus ± angustato rotundatis, rectae vel leviter curvatae, decolores, loculis 16—22, late ellipsoideis, 3—4 apicalibus ± lentiformibus, 75—100 μ longae et 8—11 μ latae, J intense coeruleae. — Tab. V, Fig. 4.

Celebes: B. Poka Pindjang, 2800 m s. m., nr. 3.

Die Art stimmt im Gehäuse- und Sporenbau mit *Gr. marginifera* Vain. (Lich. Ins. Philipp., p. 238) überein, ist aber äußerlich von dieser durch den Habitus des Thallus und die Gestalt der Apothecien deutlich verschieden. Auch scheinen die Schläuche der neuen Art regelmäßig viersporig zu sein.

5. Graphis (sect. Aulacogramma) dupaxana Vain.

E. A. Vainio, Lich. Ins. Philipp. in Ann. Acad. Scient. Fenn., Ser. A. v. XV 6 (1921), p. 241. — A. Zahlbruckner, Catal. Lich. univ. II (1924), p. 302.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 25—50 μ altus, continuus, sat expansus, substratum arcte obducens, sed cum particulis superioribus corticis dehiscens, laevis, lacteus, subnitidulus, KHO dilutissime flavescens, sorediis et isidiis destitutus, in margine passim linea tenuissima, nigra, undulata cinctus. Stratum corticale indistinctum, < 10 μ altum, decolor, ex hyphis tenuissimis, ± horizontalibus compositum; gonidia increbra, dispersa, chroolepoidea.

Apothecia crebra, lirellina, dispersa, sessilia, ad basim abrupta, semper simplicia, bacillaria, arcuata vel parce flexuosa, 0.7—3.0 mm longa et 0.3—0.4 mm lata, apicibus bene rotundatis, omnino nuda, nigra, nitidula, superne convexa, laevia vel longitudinaliter 2—3 × indistincte striatula, disco angustissimo, impresso, nigro, epruinoso. Excipulum integrum, fuligineum, ad basim angustato-planatum, 50—70 μ altum, labiis fuligineis, semilunatis, extus nudis, 3—5 × indistincte crenulatis, 100—130 μ latis, superne arcuatim coniventibus. Hypothecium ca. 10 μ altum, subdecolor. Hymenium in sectione transversali cordato-rotundatum, superne ± nigro

pulverulentum, ceterum decolor, purum, dilucidum, 80—100 μ latum et 50—100 μ altum. Paraphyses filiformes, simplices, strictae, densae, ca. 1 μ crassae, eseptatae, parum conglutinatae, ad apicem haud latiores, J haud flavescentes. Asci ellipsoideo- vel oblongo-clavati, membrana ad latera tenui, superne usque 8 μ crassa cincti, 60—75 μ longi et 15—30 μ lati, J luteo-sanguinei, 8-spori. Sporae bi- vel subtriseriales, oblongo-dactyloideae, uno vel utroque apice angustato-rotundato, rectae, in ascis ± curvulae, decolores, 7—11-loculares, loculis discoideo-ellipticis, apicalibus subconicis, 30—54 μ longae et 6—12 μ latae, J obscure coeruleae. — Tab. V, Fig. 5.

Celebes: Malili, 0 m s. m., nr. 116.

6. Graphis (sect. Aulacogramma) subintegra Redgr. nova sp.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 75—125 μ altus, continuus, sat expansus, substrato bene adpressus, minute ruguloso- vel rimuloso-inaequalis, lacteus, opacus, KOH ochraceo-fulvescens, sorediis et isidiis nullis, pars marginalis non visa. Stratum corticale sat distincte separatum, decolor, purum, ± 15 μ altum, ex hyphis tenuibus, ± horizontalibus formatum: stratum gonidiale continuum, gonidiis crebris, dispersis, chroolepoideis, pallide virentibus.

Apothecia crebra, lirellina, dispersa, sessilia, ad basim abrupta, simplicia vel trifurcata vel increbre ramulosa, juvenilia subrecta, mox arcuata, irregulariter flexuosa et undulata, usque 12 mm longa et 0,35—0,5 mm lata, apicibus rotundatis vel angustato-acutatis, margine thallino, crassiusculo, laevi, integro, lacteo, bene prominulo cincta, superne excipulo perrumpente, sed summum marginem thallinum non superante, nuda, plumbeo-nigricantia, laevia, subnitidula, haud convexa, disco angustissimo, impresso, nigro, epruinoso. Excipulum integrum, fuligineum, ad basim planatum, ca. 100 μ altum, extrorsum versus haud productum, labiis erectis, fuligineis, integris, 75—100 μ latis, extus margine thallino ca. 100 μ lato vestitis, superne nudis, in sectione verticali undulato-subintegris, angulatim coniventibus et angustatis (± 40 μ). Hypothecium 25—40 μ altum, subdecolor. Hymenium in sectione transversali rotundatum, superne pallidum, non pulverulentum, ceterum decolor, purum, dilucidum, 150 μ altum et aequilatum, J haud flavescens. Paraphyses filiformes, simplices, strictae, densae, ca. 0,8 μ crassae, bene conglutinatae, non clavatulae, eseptatae. Asci oblongo-clavati, membrana sat tenui, superne ad 8 μ incrassata cincti, 105—135 μ longi et 12—24 μ lati, 6—8-spori. Sporae biseriales, fusiformes, apicibus angustato-rotundatis, rectae, decolores, loculis 11—16, transversim ellipsoideis, 30—66 μ longae et 6—10 μ latae, J bene coeruleae. — Tab. V, Fig. 6.

Java: Tjibodas, 1400 m s. m., nr. 101.

Steht *Gr. rimulosa* (Mont. et v. d. Bosch) nahe, zeigt aber in allen Teilen größere Maße und ist durch die wellige Begrenzung der *labia excipuli* im Querschnitt auffallend.

7. Graphis (sect. Eugraphis) leptocarpa Fée.

A. Fée, Ess. Cryptog. Ecorc. Offic. 1824, p. 36, tab. 9, fig. 2. — E. A. Vainio, Lich. Ins. Philipp. in Ann. Acad. Scient. Fenn., ser. A. v. XV 6 (1921), p. 250. — A. Zahlbruckner, Catal. Lich. univ. II (1924), p. 315.

Thallus corticola, epiphloeodes, crustaceus, uniformis, tenuis, 45—80 μ altus, subcontinuus, sat expansus, membranaceus, substratum arcte obducens, sed hinc inde desquamescens, laevis, ± cinerascenti-albus, opacus, KOH haud reagens, sorediis et isidiis nullis, in margine linea tenui, nigra cinctus. Stratum corticale 12—15 μ altum, sat distincte separatum, decolor, purum, ex hyphis tenuibus, ± horizontalibus formatum; gonidia inerebra, dispersa, chroolepoidea, pallide virentia; medulla decolor, pura.

Apothecia crebra vel creberrima, lirellina, dispersa, semi-immersa vel subsessilia, fere semper simplicia, rarissime trifurcata, vulgo recta vel subrecta, bacillaria, hinc inde ± arcuata, apicibus bene vel angustato-rotundatis, 0,4—2,0 mm longa et 0.3 mm lata, in parte inferiore margine thallino, integro, tenui cincta, superne nuda, nigra, laevia, opaca, planata, disco rimiformi, impresso, nigro, epruinoso, madefacto paululum planato-dilatato, obscure fusco. Excipulum ad basim late deficiens, labiis fuligineis, erectis, inferne planatis, extrorsum versus breviter productis, integris, extus margine thallino vestitis, 35—50 μ latis, superne angustioribus, nudis, paulum incurvatis. Hypothecium ± 25 μ altum, decolor. Hymenium in sectione verticali subrotundatum, superne modice pulverulentum, fuscescens, ceterum decolor, purum, 75—90 μ altum et 90—135 μ latum, J lutescens. Paraphyses filiformes, simplices, strictae, densae, ca. 1 μ crassae, eseptatae, modice conglutinatae, ad apicem haud latiores. Asci oblongo-clavati, membrana tenui cincti, 60—75 μ longi et 15 μ lati, 8-spori. Sporae biseriales, oblongae, apicibus rotundatis, rectae vel subrectae, decolores, loculis 9—12, lentiformibus, 22—36 μ longae et 6—7 μ latae, J coerulescentes. — Tab. V, Fig. 7.

Celebes: Rante Lemo, 1200 m s. m., nr. 47.

8. Phaeographis (sect. Chiographa) dendroides (Leight.) Müll. Arg.

W. A. Leighton, Lich. Ceylon. in Transact. Linn. Soc. London, v. 27 (1869), p. 179 (sub *Platygrapha*). — A. Zahlbruckner, Catal. Lich. univ. II (1924), p. 370. — E. A. Vainio, Lich. Ins. Philipp. in Ann. Acad. Scient. Fenn., Ser. A, v. XV/6 (1921), p. 221.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 40—70 μ altus, continuus, sat expansus, substrato bene adpressus, chondroideus, laevis vel subtratum sequens grosse rugulosus, glauco-ochraceus vel olivaceus, subopacus, KOH ferrugineo-subsanguineus, sorediis et isidiis destitutus, pars marginalis non visa. Stratum corticale bene separatum, 20—30 μ altum, flavescens, purum, ± plectenchymaticum; stratum gonidiale continuum, gonidiis sat crebris, chroolepoideis, pallide virentibus.

Apothecia sat crebra, lirellina, dispersa, robusta, adpresso-sessilia, ad basim abrupta vel subconstrictula, juvenilia subrecta et simplicia, demum parce vel dendritice ramulosa (« dichotome repetito-ramosa »), irregulariter flexuosa et undulata, apicibus bene rotundatis, in specimine citato 0,8—14,0 mm longa (sed probabiliter longiora), 0,7—0,8 mm lata, extus margine hyphoso, integro, crassiusculo, laevi, albo, ca. 150 μ lato, discum modice superante cincta, disco late dilatato planato vel concavulo, ca. 0,4—0,5 mm lato, laete caesio-pruinoso. Excipulum integrum, fuligineum, infra hymenium inerassatum, in sectione transversali subcaliciforme, ad basim planatum, 80—100 μ altum, extrorsum versus breviter angustatum, labiis erectis, integris, fusco-fuligineis, angustis (ca. 20 μ latis) et superne sensim evanescentibus, extus margine crassiusculo, hyphoso, albo, sat insperso, non corticato, ex hyphis tenuissimis, intricatis formato, superne rotundato, 100—150 μ lato, versus basim angustato usque ad verticem obductis. Hypothecium ca. 50 μ altum, subdecolor, purum. Hymenium in sectione transversali semicirculare vel late ellipsoideum, superne planatum, 10—15 μ fusco-pulverulentum, ceterum decolor, sat inspersum, 100—350 μ latum et 100—150 μ altum, J rufescenti-luteum. Paraphyses filiformes, simplices, strictae, densae, 1,0—1,5 μ crassae, bene conglutinatae, eseptatae, non clavatulae. Asci oblongi, membrana tenui, in juventute superne ad 10 μ inerassata cincti, ca. 90 μ longi et 9—18 μ lati, 4- vel 8-spori. Sporae uniseriales, verticales vel obliquae, cylindrico-oblongae, rectae, apicibus late rotundatis, fuscescentes, demum fusco-obscuratae et corrugatae, loculis 6—7, mediis lentiformibus vel discoideis, apicalibus subglobosis, 20—27 μ longae et 6—9 μ latae, J haud obscuriores. — Tab. V, Fig. 8.

Celebes: Kendari, 500 m s. m., nr. 45.

Die Art stimmt im äußeren Habitus sowie im Bau der Lirellen mit *Ph. planiuscula* Müll. Arg. überein, unterscheidet sich aber von dieser durch kürzere Sporen.

9. Phaeographis (sect. Chiographa) celebensis Redgr. nova sp.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 150—250 μ altus, continuus, latissime expansus, substratum arcte obducens, chondroideus, laevigato-inaequalis vel ob substratum ± rugulosus, passim hyphis inerebris, exeuntibus obtectus et ibidem quasi pilosulus, ochrascenti-albidus vel avellaneus, subnitidulus, madefactus gelatinoso-turgescens, KOH lutescens, sorediis et isidiis nullis, pars marginalis non visa. In sectione verticali non in stratum corticale, gonidiale et medullare separatus, in toto ex hyphis tenuissimis, intricatis, decoloribus, puris formatus; gonidia rarissima, pallida, parum visibilia, chroolepoidea.

Apothecia inerebra, longe dispersa, primum singularia, strato hyphoso obtecta et verruculiformia, cum thallo ± concoloria, superne rotundata, dein strato hyphoso perrupto lirellina, sessilia, ad basim constricta, simplicia, subrotundata, ellipsoidea vel elongata, subrecta, 0,8—3,0 mm longa

et 0,8—1,2 mm lata, margine hyphoso, integro, sat crassiusculo, thallo distincte pallidiore, laevi, discum haud prominente cincta, demum margine ± undulato et crenulato pluries et irregulariter lobulata, verrucas subglobosas, 2—4 mm latas et ca. 1,5 mm altas, ad basim constrictas formantia, disco late dilatato, planato, madefacto convexo, fusco-nigro, epruinoso, 0,7—2,0 mm lato. Excipulum fusco-fuligineum, integrum, ad basim bene incrassatum, ± planatum, 140—380 μ altum, in sectione verticali late caliciforme, extrorsum versus non productum, ± abruptum, labiis paulum divergentibus, fusco-fuligineis, integris, indistincte separatis, extus margine hyphoso, ca. 100 μ lato, insperso usque ad verticem obtectis, 50—80 μ latis. Hypothecium indistinctum, dilute fuscescens, ca. 50 μ altum, inferne planatum. Hymenium superne planatum vel leviter convexum, ca. 5 μ pallide fuscum, ceterum flavescens, dense inspersum, ± 200 μ altum et usque 1,2 mm latum, J haud coloratum. Paraphyses filiformes, simplices, strictae, densae, bene conglutinatae, granulis minutis, numerosissimis obtectae, 0,8—1,0 μ crassae, eseptatae, non capitatae. Asci cylindrico- vel oblongo-clavati, ± 150 μ longi et 20—25 μ lati, 8-spori. Sporae biseriales et verticales vel obliquae et subuniseriales, rectae vel subrectae, cylindrico- vel oblongo-dactyloideae, altero apice rotundato, altero angustato, juveniles decolores, dein fuscescentes, demum obscuratae et corrugatae, 8—14-loculares, loculis ± lentiformibus, apicalibus subconicis, 32—45 μ longae et 6—9 μ latae, J coerulescenti-violaceae, hinc inde halone decolori, indistincto, tenui cinctae. — Tab. V, Fig. 9.

Celebes: B. Rante Mario, 2800 m s. m., nr. 72.

Es besteht zweifellos eine gewisse Verwandtschaft der neuen Art mit *Ph. exaltata* Müll. Arg. (Ann. Crypt. Exot. I, 1928, p. 133) und *Ph. megistocarpa* (Leight.) (Transact. Linn. Soc. London 27, 1869, p. 178); möglicherweise ist sie eine Varietät der letzteren.

10. Phaeographis (sect. Chiographa) aggregata Redgr. nova sp.

Thallus corticola, epiphlocodes, crustaceus, uniformis, 70—100 μ altus, continuus, sat expansus, substrato bene adpressus, chondroideus, minute ruguloso- vel laevigato-inaequalis, ochraceus vel partim stramineo-expallescens, subnitidulus, KOH luteo-fulvus, sorediis et isidiis nullis, in margine bene limitatus, sed linea nigra non cinctus. Stratum corticale optime evolutum, eu-chondroideum, 40—60 μ altum, luteum, purum, ex hyphis tenuissimis, intricatis formatum; stratum gonidiale continuum, ca. 25 μ altum, gonidiis crebris, chroolepoideis, virentibus, ca. 6 μ latis.

Apothecia crebra, lirellina, subimmersa, dispersa vel vulgo dense asteroideo- vel palmatim approximata et aggregata, sed stromata vera non formantia, saepe paralleliter disposita, simplicia, trifurcata vel increbre ramulosa et palmatim divisa, apicibus bene vel angustato-rotundatis, usque 3 mm longa et 0,2—0,3 mm lata, margine nullo, sed linea tenuissima, nigra summi excipuli cincta, disco late dilatato, planato, caesio-pruinoso. Excipu

lum integrum, fusco-fuligineum, inferne incrassatum, planatum, 40—50 μ altum, extrorsum versus ± longe et anguste productum, saepe alterum cum altero confluens, labiis erectis, integris, fusco-nigris, verticalibus vel leviter divergentibus, 10—20 μ latis vel ± evanescentibus, extus usque ad verticem thallo immersis, sed superne eum perrumpentibus. Hypothecium subflavescens, 8—10 μ altum, modice inspersum. Hymenium in sectione verticali semicirculare vel ellipsoideum vel semilunatum, superne paulum fusco-pulverulentum, ceterum dilute flavescens, densissime inspersum, 70—90 μ altum et 50—200 μ latum, J—. Paraphyses filiformes, simplices, strictae, densae, ca. 1,0—1,5 μ crassae, optime conglutinatae, eseptatae, clavatulae. Asci oblongo-clavati, membrana tenui cincti, ca. 60 μ longi et 9—12 μ lati, 8-spori. Sporae biseriales, subcylindrico-oblongae, apicibus late rotundatis, rectae, fuscescentes, mox fusco-obscuratae et corrugatae, 4-loculares, loculis globosis vel late ellipticis, 15—18 μ longae et 6—7 μ latae, J—.— Tab. V, Fig. 10.

Celebes: Moeara Sampara, 0 m s. m., nr. 134 pr. p.

Habitu *Ph. dendriticae* affinis, sed sporis semper 4-locularibus et minoribus ab ea differt.

11. Phaeographis (sect. Platygramma) ceratoides (Vain.) A. Zahlbr.

E. A. Vainio, Lich. Ins. Philipp. in Ann. Acad. Scient. Fenn., ser. A, v. XV/6 (1921), p. 227. — A. Zahlbruckner, Catal. Lich. univ. II (1924), p. 365.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 100—150 μ altus, continuus, expansus, substratum arcte obducens, subtartareus, verruculoso-inaequalis, verruculis minutis, semigloboso-adpressis, ± confluentibus obtectus, albido-flavescens, passim in ochroleucum vergens, subnitidulus, KOH fulvescens, fissuris vulgo trifurcatis, 5—7 mm longis, sat hiantibus (ca. 0,2 mm latis) increbre instructus, sorediis et isidiis destitutus, pars marginalis non visa. Stratum corticale ca. 10 μ altum, decolor, purum, ex hyphis tenuibus, indistincte horizontalibus formatum, subtus stratum hyphosum (medullare), inspersum, ca. 50—60 μ altum; stratum gonidiale aequicrassum, continuum, gonidiis sat crebris, chroolepoideis, sordide virentibus.

Apothecia increbra, dispersa, lirellina, subimmersa, demum emergentia, juvenilia simplicia vel trifurcata, dein 8—10 × dendroideo-ramosa, flexuosa et undulata, usque 7 mm longa et 0,3 mm lata, apicibus angustato-rotundatis vel longe acutatis, margine thallino, tenui, integro, discum non superante vel tamen depresso, cum thallo concolore cincta, disco late dilatato planato vel leviter concavulo, nigro, opaco, epruinoso, 0,2—0,3 mm lato. Excipulum integrum, rufo-fuscum, infra hymenium fusco-fuligineum, planatum, 25—30 μ altum, stratum fuligineum ca. 10 μ altum extrorsum versus breviter angustato-productum, labiis erectis, ± fuscis, integris, verticalibus vel leviter divergentibus, 20—25 μ latis, extus margine thallino usque ad

verticem obductis. Hypothecium ca. 40 μ altum, subdecolor vel in parte inferiore rufescenti-lutescens. Hymenium in sectione transversali semilunatum vel ellipsoideum, superne 10—15 μ dilute fuscescens, haud pulverulentum, ceterum decolor, purum, ca. 100 μ altum et 200—350 μ latum, J immutatum. Paraphyses filiformes, simplices, strictae, densae, ca. 1 μ crassae, eseptatae, bene conglutinatae, ad apicem paululum clavatulae. Asci cylindrici, membrana tenui cincti, 60—80 μ longi et ± 10 μ lati, 8-spori. Sporae uniseriales, verticales vel obliquae, oblongo-ellipsoideae, rectae, apicibus rotundatis, primum decolores, mox bene fuscae, 4-loculares, loculis mediis ellipsoideis, apicalibus subconicis, 10—13 μ longae et 5—7 μ latae, J incoloratae. — Tab. V, Fig. 11.

Celebes: B. Poka Pindjang, 2500 m s. m., nr. 35.

Das unter der bei Vainio zitierten Nummer «Merrill 6654» im Herbar des Wiener Staatsmuseums befindliche Exemplar (Kotypus) gehört zu einer ganz anderen *Graphis*-Art; das Material aus Celebes stimmt aber mit der Originaldiagnose und dem in Åbo befindlichen Urstück (Typus) völlig überein.

12. Graphina (sect. Eugraphina) subserpentina (Nyl.) Müll. Arg.

W. Nylander, Lich. Nov. Granat. Prodr. in Acta Soc. Sc. Fenn. 7 (1863), p. 465 not. et Lich. Ceylon., ibid. 26/10 (1900), p. 21. — E. A. Vainio, Lich. Ins. Philipp. in Ann. Acad. Sc. Fenn., Ser. A, v. XV, 6 (1921), p. 206. — A. Zahlbruckner, Catal. Lich. univ. II (1924), p. 427.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 100—160 μ altus, continuus, late expansus, substrato optime adpressus, tartareus, laevigatus vel passim substratum sequens ± ruguloso-inaequalis, pallide limoso-ochraceus vel albido-glaucescens vel -flavescens, subopacus, KOH ferrugineo fulvus, sorediis et isidiis destitutus, in margine hinc inde linea tenuissima fusco-nigra cinctus. Stratum corticale parum evolutum et indistincte separatum, ca. 10 μ altum, decolor, purum, ex hyphis tenuissimis, intricatis formatum; gonidia rara, dispersa, chroolepoidea; medulla crassa, inspersa, glauco-ochracea, spongiosa.

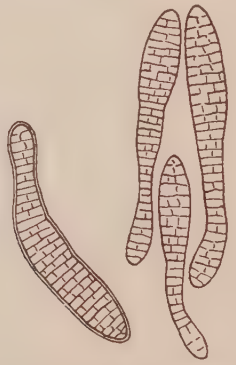
Apothecia crebra vel creberrima, lirellina, dispersa, immersa, simplicia vel trifurcata vel raro parce et increbre ramulosa, juvenilia recta vel subrecta (bacillaria), apicibus rotundatis, dein flexuosa et irregulariter undulata, apicibus angustato-acutatis, 0,2—7,0 mm longa et 0,3—0,4 mm lata, margine thallino, integro, crassiusculo, haud vel paululum prominulo, cum thallo concolore et ab eo hinc inde linea tenuissima, impressa separato cincta, superne excipulo perrumpente nuda, nigra, convexula vel planata, subopaca, disco angustissimo, impresso, haud conspicuo, nigro, epruinoso. Excipulum dimidiatum, inferne deficiens, labiis erectis, fuligineis, integris, ad basim planatis et utrinque breviter angustato-productis, usque 230 μ altis et ± 50 μ latis, extus margine thallino vestitis, superne nudis, saepe obtusato-clavatim incrassatis et sensim arcuatim convergentibus. Hypo-

thecium indistinctum, ca. 15—20 μ altum, decolor. Hymenium in sectione transversali subrotundatum vel late ellipsoideum, superne non pulverulentum et haud fuscescens, ceterum subdecolor, modice inspersum, 160—300 μ latum et 140—200 μ altum, J dilute vinose flavescens. Paraphyses filiformes, simplices, strictae, densae, eseptatae, 1 μ crassae, sat bene conglutinatae, ad apicem non latiores. Asci oblongo-clavati, membrana tenui cincti, usque 120 μ longi et 15—30 μ lati, 1(—2)-spori. Sporae vulgo solitariae, ellipsoideo-oblongae, rectae, apicibus bene rotundatis, decolores, murales, loculis numerosissimis, leptodermaticis, pluriangulatis, in seriebus horizontalibus 20—32, verticalibus 5—8, 70—105 μ longae et 20—27 μ latae, J intense coeruleae, halone nullo indutae. — Tab. V, Fig. 12.

Celebes: Kendari, 0 m s. m., nr. 46.

13. Phaeographina (sect. Epiloma) kendariensis Redgr. nova sp.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 75—100 μ altus, continuus, sat expansus, substratum arcte obducens, membranaceus, laevis,



Phaeographina kendariensis Redgr. — Abnormale Sporenformen.

lacteus, partim ochraceo-fuscescens vel -rufescens, subopacus, KOH fulvo-fuscescens, sorediis et isidiis nullis, pars marginalis in specimine citato non visa. Stratum corticale indistinctum, ca. 10 μ altum, subdecolor vel flavescens, ex hyphis tenuissimis, ± horizontalibus formatum; gonidia increbra, dispersa, chroolepoidea; medulla dissoluta, alba, inspersa et aerem continens.

Apothecia sat crebra, lirellina, dispersa, primum subimmersa, dein adpresso-semi-erumpentia, simplicia vel hinc inde trifurcata, subrecta vel arcuata vel parce flexuosa, apicibus ± longe angustatis, usque 5(—6) mm longa et 0,4—0,6 mm lata, extus margine thallino, integro, mediocri, cum thallo concolore, distincte prominulo cincta, superne nuda, nigra, opaca, planata, laevia, disco rimiformi, nigro, impresso, epruinoso. Excipulum integrum, in parte inferiore pallidum, flavescens vel luteum, ad basim pla-

natum, indistinctum, 15—20 μ altum, extrorsum versus angustato-productum, labiis erectis, integris, in parte basali lutescentibus, 25—40 μ latis, extus margine thallino, 60—100 μ lato obductis, superne incrassatis, fuligineis, usque 75 μ latis, nudis, angulatim convergentibus et versus discum angustatis. Hypothecium indistinctum, inspersum, subdecolor, ca. 20 μ altum. Hymenium in sectione transversali late rotundatum, superne paululum obscuratum, haud pulverulentum, ceterum decolor, dense inspersum, ca. 200 μ latum et 150—200 μ altum, J vinose flavescens. Paraphyses filiformes, simplices, strictae, densae, ca. 1,5 μ crassae, eseptatae, modice conglutinatae, non clavatulae. Asci oblongo- vel ellipsoideo-clavati, membrana in juventute ad 7 μ incrassata cincti, 140—180 μ longi et 30—48(—60) μ lati, 4—6-spori. Sporae subbi- vel subtriseriales, oblongae, apicibus rotundatis, rectae vel leviter arcuatae, dilute fuscescentes, loculis leptodermaticis, numerosis, in seriebus superpositis 22—34, 1—4-locellatis, 100—130 μ longae (deformatae usque 160 μ), 21—24 μ latae, halone tenuissimo, decolori indutae, J violaceo-coeruleae. — Tab. V, Fig. 13.

Celebes: Kendari, 50 m s. m., nr. 136 pr. p.

14. Sarcographa (sect. Eusarcographa) labyrinthica (Ach.) Müll. Arg.

J. Müller, Graphid. Féean. in Mém. Soc. Phys. et Hist. Nat. Genève 29/8 (1887), p. 62. — E. A. Vainio, Lich. in Flora of Koh Chang in Botan. Tidsskr. 29 (1909), p. 131. — A. Zahlbruckner, Catal. Lich. univ. II (1924), p. 462.

var. quatuorseptata Vain.

E. A. Vainio, Lich. Ins. Philipp. in Ann. Acad. Sc. Fenn., Ser. A, v. XV/6 (1921), p. 230.

Thallus corticola, epiphloeodes, crustaceus, uniformis, 50—75 μ altus, continuus, chondroideus, laevigatus vel laevis, substrato bene adpressus, ochraceo- vel luteo-fuscus, subnitidulus, KOH fusco-aurantiacus, sorediis et isidiis nullis, pars marginalis non visa. Stratum corticale ca. 30—45 μ altum, lutescens, ex hyphis horizontalibus, tenuibus, gelatinam amplam percurrentibus formatum; gonidia increbra, chroolepoidea, dispersa vel partim in substratum penetrantia.

Stromata apotheciorum a thallo bene separata, dispersa, rotundata vel irregulariter elongata, prominula, superne applanata, albida, opaca, KOH dilute flavescentia, 1,5—4,0 mm lata et 0,15—0,2 mm alta, intus densissime inspersa, imperspicua; apothecia numerosissima, minuta, dense approximata, rotundata, oblonga vel elongata, simplicia vel depauperato-ramulosa, saepe fissuris tenuissimis separata, discis planis, caesio-pruinosis vel versus marginem vel in toto fuscescentibus, linea nigra tenuiter cinctis. Excipulum integrum, fusco-nigrum, inferne bene incrassatum, in sectione transversali subcaliciforme, 60—100 μ altum et ca. 230 μ latum, ad basim planatum, extrorsum versus angulatum, labiis erectis, integris, fusco-nigris, 25—30 μ latis, non arcuatis. Hymenium in sectione transversali

semicirculare, superne planatum, fuscescens, modice pulverulentum, ceterum dilute fuscescens, purum, 60—90 μ altum et (60—)100—250 μ latum, J dilute lutescens. Paraphyses filiformes, simplices, strictae, densae, bene conglutinatae, < 1 μ latae, eseptatae, ad apicem non latiores. Asci oblongo-clavati, membrana tenui cincti, ± 75 μ longi et 7—10 μ lati, 4—8-spori. Sporae uni- vel biseriales, oblongo-ellipsoideae, apicibus rotundatis, rectae, primum decolores, mox fuscescentes, demum obscuratae et corrugutae, 4—5-loculares, loculis mediis lentiformibus, apicalibus subconicis, 12—18 μ longae et 5—7 μ latae, J fuscae. — Tab. V, Fig. 14.

Celebes: Kendari, 50 m s. m., nr. 136 pr. p.

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Erklärung zur Tafel V.

Vertikalschnitte durch ein Apothecium und Sporenbilder.

1. *Arthothelium spectabile* var. *sublirellinum*,
2. *Opegrapha robusta*,
3. *Graphis intricata*,
4. *Graphis Kjellbergii*,
5. *Graphis dupaxana*,
6. *Graphis subintegra*,
7. *Graphis leptocarpa*,
8. *Phaeographis dendroides*,
9. *Phaeographis celebensis*,
10. *Phaeographis aggregata*,
11. *Phaeographis ceratoides*,
12. *Graphina subserpentina*,
13. *Phaeographina kendariensis*,
14. *Sarcographa labyrinthica* var. *quatuorseptata*.

A Taxonomic Review of the Tulasnellaceae.

By Donald P. Rogers.

(With plates VI—VII.)

The *Tulasnellaceae* is a family of delicate resupinate basidiomycetes, closely allied to the *Tremellaceae* as represented by *Sebacina* and to the *Thelephoraceae* through the anomalous genus *Botryobasidium*, but distinctly set apart from both groups by its basidial morphology. The mature basidium is a pyriform structure bearing on its summit usually four inflated, elongate appendages which finally are cut off by basal septa and which bear the basidiospores. The septation of the basidium and the germination of the basidiospores of all species by secondary spores mark the *Tulasnellaceae* as heterobasidiomycetes.

The terminology proposed by Neuhoff[1] and adopted by the present writer in an earlier paper[2] on the *Tulasnellaceae* is to be employed in this discussion. The primary basidial cell, the probasidium, which forms only the basal portion of the mature basidium, in the mature basidium is referred to as the hypobasidium; the bodies upon its summit, equally a part of the basidium, are to be called not sterigmata, but epibasidia. Only the slender sporiferous tips of these bodies are true sterigmata. It is believed that "hypobasidium" and "epibasidium" should be used wherever possible in discussions of the heterobasidiomycetes, as being terms of greater accuracy and conciseness. It appears probable that the observation of such morphologic accuracy will reduce the sort of taxonomic confusion that results, for example, from the use of the same word for the sporigenous portions of the basidium of *Tulasnella* and the organs of spore discharge in such a genus as *Corticium*.

As usually treated the family *Tulasnellaceae* is divided into two genera, *Gloeotulasnella* von Höhnel & Litschauer with such species as possess gloeocystidia and *Tulasnella* Schroeter with all others. The practice of maintaining separate genera for groups of hymenomycetes distinguished solely by the possession of gloeocystidia or cystidia has been adequately criticised by Burt[3]. Concerning *Gloeotulasnella* as hitherto defined it appears proper to hold with him that "it seems unnecessary and a great pity to segregate already small genera on the basis of every positive character

[1] Bot. Archiv 8: 250—297. 1924.

[2] Bot. Gaz. 94: 86—105. 1932.

[3] Mo. Bot. Gard. Ann. 1: 191. 192. 1914; 8: 366. 1921; 13: 174. 1926.

which would make a species noteworthy" — possession of gloeocystidia being such a character. Furthermore, as Bourdot notes (in a letter), "Dans les espèces molles ou gélatineuses ... les basides elles-mêmes n'ont pas de forme définie, passant à la forme de gléocystides, etc." The production in some forms of ill- or well-defined gloeocystidia as, apparently, a degeneration phenomenon argues a closer kinship than generic separation would imply between the gloeocystidiate species and certain of those having no such sterile hymenial organs. And finally, in some of the forms hitherto retained in *Tulasnella* there is complete agreement in a number of characters with the species of *Gloeotulasnella* and a marked difference from such forms as *T. violea* (Quélet) Bourdot & Galzin, typical of *Tulasnella*. Such significant characters are texture of basidiocarp, which in *T. pinicola* Bresadola, for example, and in all the species placed in *Gloeotulasnella* is mucous-gelatinous, almost deliquescent; structure of basidiocarp, the basidia being borne on long, slender hyphae perpendicular to the substratum; form of basidium, the probasidium being typically a considerably elongated cell with subglobose summit and claviform stalk, and the epibasidia producing long, cylindric rather than subulate filaments; and basidial cytology, the hypobasidium sometimes giving rise to more than four epibasidia, and thus showing evidence of the occurrence of a postmeiotic division here, but the epibasidia usually remaining uninucleate. The differences between these latter *Tulasnellaceae* with mucous-gelatinous basidiocarp and clavate-capitate basidia and those with waxy basidiocarp and ovate basidia are fundamental—sufficiently so, surely, to necessitate generic separation—just as the single character of the possession or lack of gloeocystidia is superficial, artificial, and wholly insufficient. It is therefore proposed to emend *Gloeotulasnella* as originally defined to make it include allied species hitherto retained in *Tulasnella,* placing together in the former genus all mucous forms, and leaving in the latter the closely interrelated species with slight subiculum and waxy texture. The name *Gloeotulasnella,* be it noted, is fully as appropriate for the fungi included in the new grouping suggested as for the old.

The assignment of the genus *Botryobasidium* to the *Tulasnellaceae* by Donk[4] seems to be based on an incomplete understanding of the tulasnellaceous basidium. The inclusion by Killermann[5] of *Tulasnella* in the *Tremellaceae* ("Basidien ... durch 3 über Kreuz stehende, vertikale Wände in 4 Zellen geteilt") is a denial of obvious morphologic fact. Raunkiaer's[6] placing of *Tulasnella* among the *Thelephoraceae* derives from his incorrect observation that the epibasidia "are not in so much as one single case separated from the basidium by a transverse wall"; a similar disposition

[4] Nederl. Mycol. Ver. Med. 1931: 116.
[5] Engler's Natürl. Pflanzenfam. 2 ed. 6: 113, 114. 1928.
[6] Bot. Tidsskr. 36: 212. 1918.

of the group by other authors, based always on the equating of the epibasidia to *Corticium* sterigmata, implies tacit assumption of the same error.

Key to the genera.

Fructification waxy to arid-pruinose, the basidia not embedded in a matrix; probasidia obovate or with short, indistinct stalk; epibasidia with subulate filaments . . . . . *Tulasnella*

Fructification waxy-gelatinous to mucous, the basidia embedded in a gelatinous matrix; probasidia clavate-capitate; epibasidia with cylindric-tubular filaments . . . . . *Gloeotulasnella*

Tulasnella.

Tulasnella Schroeter, Cohn's Krypt.-Fl. Schles. 3 (1): 397. 1888. *Prototremella* Patouillard, Journ. de Bot. 2: 269. 1888. *Pachysterigma* Johan-Olsen in Brefeld, Unters. 8: 5. 1889. *Muciporus* Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 23. 1897.

Basidiocarp waxy or waxy-gelatinous, composed of short-celled hyphae lying directly upon the substratum and basidia borne by them almost immediately upon the substratum; probasidia ovate, with only a short, vaguely-defined stalk; epibasidia tapering to a subulate filament; spores germinating by repetition[7] or by production of numerous small conidia.

The genus as here delimited includes only the thin, waxy species. An additional indication of kinship among them is the regular occurrence of a postmeiotic mitosis in the epibasidium; this has been observed by Juel in *T. violea* (*Muciporus corticola* Juel) and by the present writer in *T. violea* (and also the smaller form described as *T. Eichleriana*), *T. pruinosa* (reported as *T. lactea*), and *T. violacea* (reported as *T. fuscoviolacea*).

Key to the species.

1. Spores globose, ellipsoid, or ovoid, the length less than twice the breadth 2
1. Spores oblong, fusiform, or cylindric, the length twice the breadth or more 6
2. On living leaves and twigs; Java . . . . . 11. *T. Cinchonae*
2. On dead plant material or old fungi 3
3. Fructification pinkish or lilaceous when fresh; spores subglobose to globose-obovate; hypobasidia subglobose to short-pyriform; epibasidia with broad base and tapering filament . . . . . 1. *T. violea*

[7] It has been suggested by Dr. G. W. Martin that the expression "germination by repetition", a paraphrase of Patouillard's "germant en se renouvelant" and "germination par rénovation", is needed to indicate the process by which the heterobasidiomycete basidiospore emits a filament tipped by a sterigma on which is borne and from which is discharged a morphologically similar secondary spore.

3. Fructification whitish when fresh (rarely pinkish, and then spores ellipsoid—*T. pruinosa*) 4
   4. Probasidia obovate-oblong; epibasidia fusiform to oblong . . 10. *T. pruinosa*
   4. Probasidia pyriform; epibasidia clearly differentiated into base and filament 5
5. Spores subglobose, about 3.5 μ . . . . . 8. *T. lactea*
5. Spores obovate or ellipsoid, 6.5 ⩽ 4 μ or larger . . 6. *T. araneosa* and 7. *T. albida*
   6. Fructification grayish when fresh; basidia of *Gloeotulasnella;* spores long, curved-cylindric, mostly over 15 μ . . . . . 19. *G. calospora*
   6. Fructification grayish or whitish when fresh; spores oblong to short subcylindric, 5—6 ⩽ 2.8—3.5 μ . . . 9. *T. bifrons*
   6. Fructification pinkish when fresh; spores cylindric to fusiform, mostly under 15 μ 7
7. Spores fusiform in bilateral aspect, subfusiform, laterally attenuated at base in dorsiventral . . . . . 2. *T. violacea*
7. Spores subcylindric 8
   8. Spores evenly curved, tapering toward the ends, 5.5—8 ⩽ 2.5—4.5 μ; mycelium with or without clamps . 5. *T. allantospora*
   8. Spores evenly curved, evenly cylindric, 9—15 ⩽ 3—4 μ; mycelium with abundant clamps . . . . . 4. *T. rutilans*
   8. Spores attenuated and laterally depressed at base, blunt at apex, unevenly curved, 9—18 ⩽ 3—5 μ; mycelium without clamps 3. *T. fuscoviolacea*

1. T. violea (Quélet) Bourdot & Galzin, Soc. Myc. Fr. Bull. 25: 31. 1909; Hym. Fr. 56. 1927; Burt, Mo. Bot. Gard. Ann. 6: 256. 1919; Rea, Brit. Basid. 739. 1922; Martin, Univ. Ia. Studies Nat. Hist. 13 (5): 7. 1931; Rogers, Bot. Gaz. 94: 89. 1932.

Corticium incarnatum var. *pinicola* Tulasne, Ann. Sci. Nat. Bot. V 15: 227. 1872. *Hypochnus violeus* Quélet, Ass. Fr. Av. Sci. 1882: 401. 1883. *Tulasnella lilacina* Schroeter, Cohn's Krypt.-Fl. Schles. 3 (1): 397. 1888; Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 21. 1897. *Corticium pinicolum* (Tulasne) Saccardo, Syll. Fung. 6: 625. 1888; ? Herpell, Hedw. 49: 210. 1910. *Corticium lilacinum* (Schroeter) Saccardo, Syll. Fung. 6: 625. 1888. *Prototremella Tulasnei* Patouillard, Journ. de Bot. 2: 270. 1888. *Pachysterigma fugax* Johan-Olsen in Brefeld, Unters. 8: 6. 1889. *Pachysterigma incarnatum* Johan-Olsen in Brefeld, Unters. 8: 7. 1889. *Corticium fugax* (Johan-Olsen) Saccardo, Syll. Fung. 9: 236. 1891. *Corticium incarnatum* (Johan-Olsen) Saccardo, Syll. Fung. 9: 235. 1891. *Tulasnella Tulasnei* (Patouillard) Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 21. 1897; Bresadola, Annal. Mycol. 1: 114. 1903. *Tulasnella fugax* (Johan-Olsen) Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 22. 1897.

Tulasnella incarnata (Johan-Olsen) Bresadola, Fung. Trid. 2: 98. 1892; Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 22. 1897; Bourdot & Galzin, Soc. Myc. Fr. Bull. 25: 31. 1909; ? Rea, Brit. Myc. Soc. Trans. 5: 254. 1916; Brit. Basid. 739. 1922. *Muciporus corticola* Juel and form *thelephorea* Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 23. 1897. *Tulasnella Eichleriana* Bresadola, Annal. Mycol. 1: 113. 1903; Saccardo, Syll. Fung. 17: 209. 1905; Bourdot & Galzin, Soc. Myc. Fr. Bull. 25: 32. 1909; Hym. Fr. 57. 1927; Burt, Mo. Bot. Gard. Ann. 6: 255. 1919; Martin, Univ. Ia. Studies Nat. Hist. 13 (5): 6. 1931; Rogers, Bot. Gaz. 94: 94. 1932. *Tulasnella thelephorea* Juel, Ark. Bot. 14 (1): 7. 1915; *Tulasnella microspora* Wakefield & Pearson, Brit. Myc. Soc. Trans. 8: 220. 1923; Bourdot & Galzin, Hym. Fr. 55. 1927; Rea, Brit. Myc. Soc. Trans. 12: 230. 1927. *Tulasnella Eichleriana* var. *lilaceo-cinerea* Bourdot & Donk, Nederl. Kruidk. Archief 1930: 83; Bourdot, Soc. Myc. Fr. Bull. 48: 207. 1932.

Illustrations: Tulasne, Patouillard, Johan-Olsen, Juel 1897, Burt, Wakefield & Pearson, Martin, Rogers.

Figure 1.

Fructification thin, waxy-gelatinous to pruinose, interrupted or continuous, when fresh lilaceous-violet, ashy-pink, or lilaceous-gray, sometimes light neutral gray (R)[8], when dry bright pink (Rhodonite pink, light pinkish violaceous R) to very light rosy gray (pallid quaker drab R); hyphae mostly parallel to the substratum, branching frequently, usually at right angles, abundantly septate, without clamps (clamps reported in var. *lilaceo-cinerea*), 2—6 μ; probasidia obovate to pyriform, 7—15 ≈ 5—10 μ; epibasidia four, when first separated from the hypobasidium obovate-subglobose, soon becoming long-ovate, slender pyriform, or occasionally fusiform, and finally tapering gradually to a subulate filament, 8—16(—25)[9] ≈ 3.5—7 μ; spores subglobose to broadly ovate, 3.5—8 ≈ 3—6.5 μ, pink in mass, germinating by a long, subulate promycelium to produce a secondary spore or rarely numerous minute, globose conidia 1 μ in diameter.

On wood and bark of all sorts and on humus, lichens, and other fungi: found every month of the year.

Bourdot, in the letter quoted elsewhere, remarks: "Les *Tulasnella* sont très variables dans tous leurs caractères. ... Entre la plupart des espèces, il y a de trop nombreux intermédiaires, de sorte que leur détermination est basée plutôt sur des moyennes de fréquence que sur des caractères précis." The forms here included in *T. violea* are certainly extremely variable, but the situation seems to be different from that described by Bourdot. It appears from the large amount of material at hand that *T. Eichleriana* and

[8] "R" after color names indicates that they are used in the sense of Ridgway, Color Standards and Nomenclature. Washington. 1912.

[9] Dimensions included in parentheses either are exceptional in the material examined or have been published but are not equaled in material examined.

the much larger European forms which alone are commonly held to constitute *T. violea* are not distinct species connected by occasional intermediates, but extremes of variation of a single species of which by far the greatest number of gatherings show the microdimensions given by Quélet (spores 6—7 μ), or the slightly smaller dimensions of *T. microspora*. Any splitting of this group of organisms into two or three or four species *(Eichleriana, microspora, violea, incarnata)* must be more arbitrary than taxonomic distinctions among the hymenomycetes are wont to be; it is both more convenient and more natural to treat it as a single highly variable species. Johan-Olsen's two species are included on the basis of coloration, texture, and form of the various organs; dimensions given in Brefeld apparently are rarely correct; suitable reduction in his figures would place both species within the upper range of *T. violea*. The specimens reported by Herpell as *Corticium pinicolum* and by Rea as *T. incarnata* (spores up to 11 ≈ 7 μ) may well be larger forms of *T. violea* than have come to hand for the present study, or equally well, forms of *T. violacea*, as noted under that species.

Specimens examined:

Sweden: Stockholm, *L. Romell 150*, under the name *T. Tulasnei* (in Farlow Herb.).

France: Allier, St. Priere, *H. Bourdot*, det. Bresadola as *T. incarnata* (in Farlow Herb.).

Austria: Tirol, Mutterer, *V. Litschauer 1;* Innsbruck, *V. Litschauer 2*, under the name *T. Eichleriana.*

Great Britain: Surrey, East Horseley, *A. A. Pearson*, paratype of *T. microspora.*

Maine: Kittery Point, *R. Thaxter & E. A. Burt*, under the name *T. Eichleriana.*

Massachusetts: Sharon, *A. P. D. Piguet*, det. E. A. Burt (in Mo. Bot. Gard. Herb. 55002).

Iowa: North Liberty, *A. M. Looney* (in D. P. R. 30, 32, 33); *D. P. R. 201, 202;* Turkey Creek, Johnson Co., *M. C. Fisher* (in D. P. R. 135); *H. C. Gilbert* (in D. P. R. 204); Iowa City, *G. W. Martin 1218, 1219, 1221, D. P. R. 18, 119, 142, 191, 195, 196, 198, 200;* Homestead, *A. M. Looney* (in D. P. R. 24); Richland, *D. P. R. 139, 193, 194, 197, 203;* East Okoboji, *G. W. Martin 1220;* Milford, *D. P. R. 199;* West Okoboji, *D. P. R. 223.*

Idaho: Priest River, *J. R. Weir 391* (Mo. Bot. Gard. Herb. 15657) det. E. A. Burt as *T. Eichleriana.*

2. T. violacea (Johan-Olsen) Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 22. 1897; Wakefield & Pearson, Brit. Myc. Soc. Trans. 8: 219. 1923; Bourdot & Galzin, Hym. Fr. 57. 1927; Rea, Brit. Myc. Soc. Trans. 12: 229. 1927.

Pachysterigma violaceum Johan-Olsen in Brefeld, Unters. 8: 5. 1889. *Corticium violaceum* (Johan-Olsen) Saccardo, Syll. Fung. 9: 236. 1891. *Tulasnella violacea* var. *lilacea* Bresadola, Annal. Mycol. 1: 112. 1903; Saccardo, Syll. Fung. 17: 210. 1905; Bourdot & Galzin, Soc. Myc. Fr. Bull. 25: 32. 1909; Hym. Fr. 57. 1927. *Tulasnella pallida* Bresadola, Annal. Mycol. 1: 114. 1903; Saccardo, Syll. Fung. 17: 210. 1905; Bourdot & Galzin, Hym. Fr. 55. 1927. *Tulasnella Brinkmannii* Bresadola, Annal. Mycol. 18: 50. 1920. Saccardo's Syll. Fung. 23: 578. 1925; Bourdot & Galzin, Hym. Fr. 56. 1927. *Tulasnella albolilacea* Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 264. 1924; Hym. Fr. 59. 1927. *Tulasnella fuscoviolacea* apud Martin, Univ. Ia. Studies Nat. Hist. 13 (5): 7. 1931; Rogers, Bot. Gaz. 94: 94. 1932, in part.

Illustrations: Johan-Olsen, Wakefield & Pearson, Bourdot & Galzin 1927, Martin, Rogers (fig. 50, 51, 54).

Figure 2.

Fructification effused, thin, waxy to gelatinous-waxy, when fresh deep or pallid violaceous, becoming lighter with drying, when dry bright rosy pink to pale lilaceous, forming a faint or conspicuous bloom or sometimes a membrane; hyphae mostly parallel to the substratum, branching at right angles, without clamps, 4—6 μ; probasidia broadly obovate to pyriform, 9—16 × 6—10 μ; epibasidia four, when first separated from the hypobasidium globose, 6—8 μ in diameter, becoming obovate to broad-clavate, and finally composed of an ovate base and subulate-conical filament, 8—20 × 6—7 μ; spores curved, subfusiform, obliquely attenuated at the apiculus, tapering strongly or only moderately at the distal end, in the bilateral aspect evenly fusiform, 9—16 × 4.6—7 μ, germinating apically or laterally by a subulate or often conical promycelium.

On wood and bark of all sorts; February to April, October. Reported also on herbaceous plants, and throughout the year.

There is considerable variation, within fairly well defined limits, in the form of the spores. *T. violacea* and *T. Brinkmannii* are based on different widths of spores, those of *violacea* in the restricted sense usually accepted being comparatively broad, and those of the much less common *Brinkmannii* being much more slender. *T. pallida* is applied to a form with a rounded, only slightly tapering, distal end: it appears probable from the descriptions that *T. albolilacea* and perhaps also *Corticium pinicolum* as understood by Herpell and *T. incarnata* as understood by Rea are much the same as this variation (although the latter two may be *T. violea*); in the specimens studied there seems always sufficient suggestion of the fusiform in spores apparently belonging to *T. pallida* to show that species to be only one of the numerous aspects of *T. violacea*. Except as it creates the broad distinction between pure white species on the one hand and rosy violaceous species on the other, color seems to be a character of little taxonomic value in this family. *T. pallida* and variety *lilacea* of *T. violacea* are only paler forms of the one species: be it noted that the material upon

which the original descriptions are based was not fresh when Bresadola studied it, and that the colors of fresh material of *Tulasnella* change and frequently fade in a matter of hours.

Specimens examined:

Austria: Tirol, Innsbruck, *V. Litschauer 4.*

Iowa: Pine Hollow, near Luxemburg, Dubuque Co., *G. W. Martin 1199; D. P. R. 253;* North Liberty, *A. M. Looney* (in D. P. R. 34); Iowa City, *G. W. Martin 381; H. C. Gilbert* (in D. P. R. 171); *D. P. R. 131, 132, 167, 168, 169, 170, 172, 173, 174.*

3. T. fuscoviolacea Bresadola, Fung. Trid. 2: 98. 1892; Saccardo, Syll. Fung. 16: 203. 1902; Bourdot & Galzin, Soc. Myc. Fr. Bull. 25: 31. 1909; Hym. Fr. 58. 1927; Burt, Mo. Bot. Gard. Ann. 6: 258. 1919.

Illustrations: Bresadola, Burt, Bourdot & Galzin 1927.

Figure 3.

Fructification waxy to gelatinous-waxy, when fresh deep, dull violaceous, becoming pale lilaceous with drying; hyphae parallel to the substratum, branching at right angles, without clamps, 3—7 μ; probasidia obovate, sometimes pyriform, 12—18 × (7.5—) 9—12 μ; epibasidia at first globose, becoming ovate to fusoid-ovate, finally with ovate base and subulate or thick and abruptly sterigmate filament, 6.5—7.5 μ thick and up to 18—22 μ long; spores subcylindric, attenuated and laterally depressed at the apiculus, rounded at the distal end, slightly curved dorsiventrally, oblong bilaterally, 9—18 × 3—5 μ, germinating by a conical promycelium.

On bark of conifer and pine cone. Reported also on broad-leaved species, and throughout the year.

The drawings and measurements of spores given in Bourdot & Galzin would place in *T. fuscoviolacea* forms with spores too broad and tapering to be properly assigned to that species, and better, perhaps, included in *T. violacea (T. pallida).* Apparently the authentic specimen of *T. fuscoviolacea* upon which Burt based his understanding of that species (see his figures) is closer to the type than the material from Bresadola examined by Bourdot. By maintaining *T. fuscoviolacea* for only those forms with spores slender and subcylindric (lateral walls approximately parallel, distal end abruptly rounded) rather than fusoid or subfusoid, a more workable and, it is believed, more natural grouping is achieved. It is far from certain that the two groups in question are specifically distinct. On the basis of the material examined, however, it appears that there is considerable difference between *T. fuscoviolacea* and the forms of *violacea* that most nearly approach it. There is no such difference between the *T. violacea* forms whose spores have a diamond-shaped outline and those *(T. pallida)* with more rounded distal end; consequently the present grouping is adopted.

Specimens examined:

Sweden: Upsala, *S. Lundell 450,* comm. V. Litschauer.

Austria: Nieder-Oesterreich, Aspang, *V. Litschauer 3.*

New Hampshire: Crawford Notch, *L. O. Overholts 4883,* det. E. A. Burt (in Mo. Bot. Gard. Herb. 57076).

4. T. rutilans (Johan-Olsen) Bresadola, Fung. Trid. 2: 98. 1892; Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 22. 1897.

Pachysterigma rutilans Johan-Olsen in Brefeld, Unters. 8: 6. 1889. *Corticium rutilans* (Johan-Olsen) Saccardo, Syll. Fung. 9: 236. 1891. *Tulasnella fuscoviolacea* apud Rogers, Bot. Gaz. 94: 94. 1932, in part.

Illustrations: Johan-Olsen, Rogers (fig. 49, 52, 53, 55, 56).

Figure 4.

Fructification thin, waxy-gelatinous, when fresh dull violaceous, when dry becoming pinkish, pale lilaceous, or invisible; hyphae branching abundantly, with abundant clamps, 3—4 (—5) μ; hypobasidia pyriform, 9—15 ≈ 6—9 μ; epibasidia when first separated from the hypobasidium subglobose to broadly obovate, 6—7 μ broad, becoming more elongate, finally with an ellipsoid base tapering abruptly to the subulate filament, 10—15 ≈ 4—5 μ; spores evenly cylindric, curved, 9—15 ≈ 3—4 μ, germinating apically or laterally by a broad, conical promycelium.

On decorticated wood of oak and other broad-leaved trees; reported on birch bark; December.

The above diagnosis departs greatly from that of Johan-Olsen in spore measurements. As seems always to be true, the measurements given in Brefeld must be reduced by a considerable, variable, indeterminable ratio. A glance at the figures of this species in Brefeld shows that 16 ≈ 8 cannot be correct; the spores are far from half as broad as long. The spores of *T. violacea,* commonly not half as broad as long, likewise are said in Brefeld to measure 16 ≈ 8 μ. Such freedom of interpretation as is here exercised finds justification in the descriptions and illustrations published in Brefeld for almost any of the better-known heterobasidiomycetes. Dr. R. Giessler of the University at Leipzig reports that there is no authentic material in the herbarium there from which to determine the character of any of Johan-Olsen's *Pachysterigmas.* The fungus described above is the one form studied having clamps at the septa and spores shaped "like the spores of *Exidia*", the spores of *T. fuscoviolacea,* most similar to those of the present species, being less evenly curved and of less uniform diameter. Spore-form and clamps create at least a presumption that the present fungus is identical with Johan-Olsen's; it seems better to describe it under his name than to erect a new species for it.

Of the two Iowa collections one (151), consisting of a few basidia scattered among the conidiophores of an *Acremonium,* has hyphae 1.5—2 μ thick. Agreeing as it does in all other points, it seems best taken as a stunted form of this species.

Specimens examined:

Germany: Ostpreußen, Königsberg, *W. Neuhoff* (XII. 15. 29), comm. V. Litschauer as 5.

Iowa: Turkey Creek, Johnson Co., *D. P. R. 106;* Iowa City, *D. P. R. 151.*

Professor Viktor Litschauer reports that he has found this *Tulasnella* near Unter-Tullnerbach, Nieder-Oesterreich.

5. T. allantospora Wakefield & Pearson, Brit. Myc. Soc. Trans. 8: 220. 1923: Bourdot & Galzin, Hym. Fr. 60. 1927: Rea, Brit. Myc. Trans. 12: 229. 1927.

Tulasnella rubropallens Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 264. 1924.

Illustrations: Wakefield & Pearson, Bourdot & Galzin 1927.

Figure 5.

Fructification very thin, waxy, when fresh pale grayish or lilaceous (pale purple drab R) to obscure rosy, when dry light pinkish, lilaceous gray, or invisible: hyphae mostly parallel to the substratum, infrequently branched, with clamps abundant or lacking, 3.5 μ: probasidia obovate, 7—10 × 5—6 μ: epibasidia four, when first separated from the hypobasidium globose to elliptical, finally with the basal portion subglobose to broadly ovate, somewhat widest near the hypobasidium, tapering very abruptly to the slender, subulate filament, 6—9 × 3—5 μ; spores thick-allantoid, tapering toward the ends, bright pink in mass, 5.5—8 (—10) × 2.5—4.5 μ; germinating by a narrowly conical promycelium.

On bark and decorticated wood of various broad-leaved trees; February to July, August to October. Reported on decorticated wood of a conifer.

The suggestion of the crescent in the form of the spores—the outer curve forming the arc of a circle smaller than the inner—seems to be distinctive of this species. The taper toward the ends is not always so pronounced as in the type; but in none of the specimens seen are the spores of uniform diameter, as in *T. rutilans*, or merely depressed oblong, as in *T. bifrons.* In most preparations there is an abundance of elliptical half-developed epibasidia, equally characteristic. The majority of the spores are 7—8 μ long, only a rare example exceeding the latter figure. Clamps occur in the type specimen, as in Bourdot's *T. rubropallens.*

Specimens examined:

Great Britain: Surrey, *A. A. Pearson,* type.

Iowa: Pine Hollow, Dubuque Co., *G. W. Martin 1166;* Iowa City, *D. P. R. 136, 137, 249;* North Liberty, *D. P. R. 179;* East Okoboji, *D. P. R. 177, 232;* West Okoboji, *D. P. R. 230.*

6. T. araneosa Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 265. 1924; Hym. Fr. 62. 1927.

Illustration: Bourdot & Galzin 1927.

Fructification forming loose cobwebby patches, then denser, whitish, difficult to separate from the substratum; hyphae guttulate, with or without clamps, 2—4 (—8) μ; probasidia obovate or pyriform, 8—15 × 6—8 μ; epibasidia four, when first separated from the hypobasidium exactly globose, finally with subglobose base and conic-subulate to almost tubular filament, 9—15 × 4—6 μ, promptly collapsed; spores obovate or oblong, attenuated obliquely at the base or depressed laterally, 6—8 × 4—5 μ.

On basswood; June. Reported as collected in October and November, on rotten wood of ash, alder, cherry.

The description given is that of Bourdot & Galzin, modified somewhat to include the single Iowa specimen. The form of the spore is the one positive character by which the species may be identified, or so it appears from the diagnosis quoted; form of epibasidium is equally distinctive in the collection cited; but the epibasidia are noted in Bourdot & Galzin as fusiform, a rather vague term as used by those authors, but even so scarcely applicable to the sphere-with-a-handle shape present in the Iowa material. The texture as given is probably characteristic enough, but not in itself sufficient to distinguish the species from very delicate fructifications of other forms. The specimen cited seems to belong here although it has abundant and conspicuous clamps; it is, however, extremely meager and poorly developed, and insufficient to give any idea of texture. It *is* difficult to separate from the substratum.

Specimens examined:

Iowa: North Liberty, *D. P. R. 15.*

7. T. albida Bourdot & Galzin, Hym. Fr. 59. 1927.

Fructification at first a very delicate bloom, then waxy, whitish; hyphae 3—6 μ; probasidia obovate, 12—18 × 7—10 μ; epibasidia four, when first separated from the hypobasidium globose, becoming oblong and finally fusiform; spores obovate or ellipsoid, slightly depressed, 6.5—7.5 — 9 × 4—5.5—7.5 μ, germinating laterally or apically.

On very rotten wood of oak; July to December; France.

No material answering the description of *T. albida* was available for the present study, and the description given is taken from Bourdot & Galzin. If the form is distinct, material of it should appear macroscopically like a pallid growth of *T. violea*, and microscopically like one of the larger forms of that species, except for having epibasidia at first somewhat more globose and spores approaching the ellipsoid or oblong. If the spores are notably attenuated, the species may be close to *T. violacea* (*T. pallida*). Apparently only its texture separates it from the earlier-described *T. arachnoidea*. On the strength of the description, it appears to be doubtfully distinct.

8. T. lactea Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 263. 1924; Hym. Fr. 57. 1927.

Illustrations: Bourdot & Galzin 1927.

Figure 6.

Fructification thin, waxy-pruinose, when fresh whitish, when dry whitish (teste Bourdot & Galzin) to pale purplish gray (R), forming an extremely thin, clearly marked, continuous crust; hyphae frequently branched, without clamps, 2—4 μ; probasidia pyriform, 7.5—9 (—12) × 4.5—5.5 (—6) μ; epibasidia when first separated from the hypobasidium globose-obovate, 4—4.5 μ, later elongate, finally with a long slender-subulate filament, and then up to 11 μ in length; spores subglobose, 3—4 × 2.5—3.5 μ, germinating by a subulate promycelium.

On decorticated willow and oak; June, October. Reported on apple and hawthorn; September.

The form of the fully developed epibasidium — the base subglobose, with the long, extremely slender filament seated upon it — seems to be the most notable diagnostic character for this species; but in fructifications past their prime this character, like basidial form in most old heterobasidiomycetes, is less regular. Color and spore-size should separate *T. lactea* from all forms except small, pallid specimens of *T. violea*. The delimitation of *T. lactea* is quite unsatisfactory; but as characterized by the specimens cited and by the description and especially the figure in Bourdot & Galzin it seems possible to distinguish the species.

Specimens examined:

Iowa: North Liberty, *D. P. R. 181;* Iowa City, *D. P. R. 182;* Hills, Johnson Co., *G. W. Martin 1194.*

9. T. bifrons Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 264. 1924; Hym. Fr. 60. 1927.

Illustration: Bourdot & Galzin 1927.

Figure 7.

Fructification very thin, waxy, grayish-white, drying whitish or sometimes very pale lilaceous; hyphae frequently branched, frequently septate, irregular, without clamps or (teste Bourdot & Galzin) with rare clamps, 1.5—3 μ; probasidia pyriform, 7—10 × 6 μ; epibasidia four, when first separated from the hypobasidium globose or short-ovate, 4—4.5 μ thick, then pyriform, and finally broadly fusiform to conical, tapering to a slender filament, 10—15 × 3—4 μ; spores oblong to subcylindric, straight, somewhat laterally attenuated, abruptly, at the apiculus, 5—6 × 2.8—3.5 μ (4.5—6 × 3.4—4 μ, teste Bourdot & Galzin), germinating apically or laterally by a subulate-conical promycelium.

On decordicated oak and elm; April to July, October. Reported also on pine.

An extremely delicate, whitish form. The spores and the stalked-globose form of the young hypobasidia and globose form of the immature epibasidia are diagnostic.

Specimens examined:

Iowa: North Liberty, *D. P. R. 9, 178, 181;* Iowa City, *H. C. Gilbert* (in D. P. R. 175); *G. W. Martin 1225*; *D. P. R. 2, 3*; Estherville, *D. P. R. 163;* Milford, *D. P. R. 164, 165.*

10. T. pruinosa Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 264. 1924: Hym. Fr. 59. 1927.

Tulasnella lactea apud Rogers, Bot. Gaz. 94: 95. 1932.

Illustrations: Bourdot & Galzin 1927; Rogers.

Figure 8.

Fructification gelatinous-waxy, arachnoid or membranous, the margin thinning out, sometimes porose, white or rosy-lilaceous, fading with drying; hyphae in thin specimens parallel to the subiculum, in thicker perpendicular, somewhat thicker-walled than elsewhere in the genus, without clamps, 3—4.5 μ; probasidia obovate-oblong, borne at the ends of short subdichotomous branches, 8—12 (—14) × 5—7 (—8) μ; epibasidia four, arising close together from the summit of the hypobasidium, when first separated from it broadly ovate to oblong, later broadly fusiform to cylindric-oblong, when mature elongate obovate, fusiform, or cylindric, with a long, fine-subulate sterigma, 6—12 (or 15) × 2—4 μ; spores long obovate to oblong, obliquely to somewhat abruptly attenuated at the base, sometimes slightly depressed laterally, 4.5—6.5 × 3—4 μ (in Bourdot & Galzin up to 14 × 8 μ), germinating by a conical promycelium.

On decorticated oak and spruce: June, August, September, November. Reported also on chestnut and beech, and from March to December.

The elongated probasidium and epibasidia and (in some collections) the erect, repeatedly forking hyphae of this species set it off sharply from other forms of *Tulasnella*. The basidium-like subbasidial hyphal cells noted by Bourdot & Galzin occur in some of the material examined, but seem to be less constant and characteristic than the subclavate probasidium and the tubular, often flexuous epibasidia.

Specimens examined:

Germany: Brandenburg, Triglitz i. d. Prignitz, *O. Jaap*; Schleswig-Holstein, Sachsenwald, *O. Jaap*; in Fung. Sel. Exsic. 334, 334 b; both as *T. Tulasnei.*

Wisconsin: Monico, *G. W. Martin 1196, 1197.*

Iowa: Turkey Creek, *G. E. Baker* (in D. P. R. 10, 12, 13, 14); Iowa City, *G. W. Martin 1195*; West Okoboji, *G. W. Martin 1007.*

11. T. Cinchonae Raciborski, Acad. Sci. Cracovie Bull. Int., Cl. Sci. Math. Nat. 1909: 369; Saccardo, Syll. Fung. 21: 452. 1912.

Fructification epiphytic, forming a pinkish powdery layer on stalks and leaves; hyphae thick, forming in places compact clumps up to 0.5 mm. thick, the basidiophores perpendicular to the substratum, up to 60 μ long; probasidia narrowly ovate, 20—24 × 8—11 μ; epibasidia four, globose or short-ovate, 7—8 μ in diameter; spores globose-ovate, 7—10 μ long.

On young growth of *Cinchona* spp., in Java.

Dr. K. B. Boedijn reports that there is no material of this form in the collections at Buitenzorg. The description given is adapted from Raciborski. While it is not certain that the structures to which he applies Juel's terminology for the tulasnellaceous basidium are actually those characteristic of *Tulasnella*, there is enough likelihood of their being such that the species is here provisionally retained in the genus. It should be easily distinguished by its habit and the presence of sclerotia ("Mycelialklumpen"), if it is actually a *Tulasnella*. It seems equally probable that *T. Cinchonae* is a *Corticium*, like *T. anceps*. Further study of the species is desirable.

Gloeotulasnella.

Gloeotulasnella von Höhnel & Litschauer, K. Akad. Wiss. Wien Sitzber., Math.-Naturw. Kl. 115 (1): 1557. 1906, emend.

Basidiocarp gelatinous or mucous-gelatinous, composed of long-celled hyphae standing perpendicular to the substratum, basidia borne at their summits, and sometimes also gloeocystidia; probasidia elongate, clavate-capitate; epibasidia tapering abruptly to a long, evenly cylindric filament; spores germinating by repetition.

The genus as here delimited includes all of the *mucous* species. An additional indication of kinship among them is the usual but not invariable absence of a postmeiotic mitosis in the epibasidium; this has been observed by Juel in *G. calospora* (*Muciporus deliquescens* Juel), and by the present writer in *G. calospora, G. pinicola* (reported as *T. Tulasnei*), and *G. opalea*. On the other hand, a third mitosis may take place in the hypobasidium; this is shown by the not infrequent occurrence of a basidium with five or more epibasidia; such basidia have been observed by the writer in *G. calospora, G. cystidiophora, G. metachroa,* and *G. pinicola.*

The publication of *Gloeotulasnella* is somewhat irregular. In discussing the species *cystidiophora* von Höhnel & Litschauer have written, "Er stellt eigentlich eine neue, der Gattung *Gloeocystidium* homologe Gattung dar, die *Gloeotulasnella* genannt werden könnte." Immediately following this, however, the species is noted as "*Tulasnella (Gloeotulasnella) cystidiophora* v. H. et L., n. sp." and on the next page as "*Tulasnella cystidiophora*". In the Österreichisches Corticieen (Wiesner-Festschrift 57) *Gloeotulasnella* is separated from *Tulasnella* in the key to the genera; on a later page is listed "*Gloeotulasnella hyalina* v. H. et Lit., n. sp."—without description. When *hyalina* actually is described (1908, p. 1114), *Gloeotulasnella* again is given in parentheses, as a subgenus; but *cystidiophora* is mentioned as *Gloeotulasnella*. Legally, then, *Gloeotulasnella* was published by von Höhnel & Litschauer only as a subgenus, and was raised to full generic rank by Bourdot & Galzin, with the publication of *traumatica* in 1909; this view is held by some authors who later refer to the first two species. The

intent seems to have been to publish the genus with the publication of *cystidiophora*; this is here taken to be the fact.

Key to the species.

1. Gloeocystidia present 2
1. Gloeocystidia absent 6
2. Gloeocystidia with yellow content 3
2. Gloeocystidia with hyaline content 4
3. Gloeocystidia clavate; probasidia with long, slender stalk and globose head; spores oblong, 4.5—6 × 3.5—4.5 μ . . . . 16. *G. opalea*
3. Gloeocystidia subcylindric; probasidia with ovoid head; spores ellipsoid, laterally attenuated at the base, 8—13 × 4—7 μ 15. *G. traumatica*
3. Gloeocystidia of various forms, irregular; spores subglobose to oblong, symmetrical, 4.5—9 × 4—7 μ . . . . . 12. *G. cystidiophora*
4. Probasidia with long, slender stalk; gloeocystidia not borne on basidiophorous hyphae . . . . . 16. *G. opalea*
4. Probasidia with stout stalk; basidia and gloeocystidia borne together on stout hyphae, fascicled 5
5. Probasidia subclaviform; mycelium without clamps 13. *G. hyalina*
5. Probasidia obovate; occasional clamps . . . . . 14. *G. metachroa*
6. Spores long curved-cylindric, mostly over 15 μ 19. *G. calospora*
6. Spores globose or ovoid 7
7. Fructification very thick, undulate-plicate, purple; hyphae with purplish content . . . . . 18. *G. tremelloides*
7. Fructification comparatively thin, pale; hyphae hyaline 17. *G. pinicola*

12. G. cystidiophora von Höhnel & Litschauer. K. Akad. Wiss. Wien Sitzber., Math.-Naturw. Kl. 115 (1): 1557. 1906; Bourdot & Galzin, Hym. Fr. 64. 1927.

Prototremella Tulasnei apud Karsten, Hedw. 35: 45. 1896. *Tulasnella cystidiophora* von Höhnel & Litschauer apud Saccardo, Syll. Fung. 21: 453. 1912; Rea, Brit. Myc. Soc. Trans. 12: 230. 1927; Pearson, Brit. Myc. Soc. Trans. 13: 73. 1928.

Illustrations: von Höhnel & Litschauer, Pearson.

Figure 9.

Fructification thin to comparatively thick, even, tuberculate, or undulate, grayish or blue-gray, mucous or gelatinous-waxy, when dry forming a thin dark film; hyphae mostly perpendicular to the substratum, branching at a sharp angle, with some clamps, 1—4 μ; gloeocystidia extremely variable in form—blunt-clavate, fusiform, moniliform, dumb bell shape, or wholly irregular—and very numerous, with yellow oily content 10—75 × 6—11 μ; probasidia obovate or clavate-capitate with ovate head.

10—19 × 7—11 μ; epibasidia four, early pyriform, later with an ovate-fusoid base and cylindric filament, 9—12 (or longer) × 4—6 μ; spores subglobose or broadly obovate, slightly or not at all laterally attenuated at the apiculus, 4.5—9 × 4—7 μ.

Reported to occur throughout the year on the bark of various deciduous trees; Europe.

The specimens are remarkable in having a large part of the basidiocarp composed of gloeocystidia. Whether this is characteristic of the species at all stages does not appear from the material examined; it is well shown in the type. It may be noted here that in the drawings published by von Höhnel & Litschauer the basidia appear to have arisen as outgrowths from horizontal hyphae, and the gloeocystidia represented are only twice as long as the basidia. As a matter of fact the gloeocystidia frequently attain a much greater size, and the basidia are separated by some distance from the substratum, borne in groups on vertical hyphae. Pearson's figure shows the structure much better; the specimen collected by him cited below agrees very well with the type. The gloeocystidia in von Höhnel's preparation of the type no longer clearly show the yellow color. Karsten, who collected and first studied the specimen, noted in his description of it (l. c.) the presence of bodies distended by "fulvescent" material, as later did von Höhnel & Litschauer.

Specimens examined:

Finland: Mustiala, *Karsten* (in Höhnel's herbarium in Farlow Herb.), type (slides).

Great Britain: Sussex, Ashdown Forest, A. A. Pearson (8. 3. 25).

13. G. hyalina von Höhnel & Litschauer, K. Akad. Wiss. Wien Sitzber., Math.-Naturw. Kl. 117 (1): 1114. 1908; Wiesner-Festschrift 59. 1908 (without description); Bourdot & Galzin, Hym. Fr. 63. 1927.

Tulasnella hyalina von Höhnel & Litschauer apud Saccardo, Syll. Fung. 21: 453. 1912.

Illustration: von Höhnel & Litschauer.

Figure 10.

Fructification thin, even, mucous-gelatinous, hyaline, when dry forming an almost invisible pinkish film; hyphae of the subiculum perpendicular to the substratum, without clamps, 2—4 μ; gloeocystidia subcylindric or fusiform, tapering more or less to the blunt-rounded apex, the content colorless, uniform, either homogeneous or with numerous minute oil droplets, 15—50 × 6—12 μ; probasidia claviform, slightly swollen at the distal end, borne several together, with the gloeocystidia, on the vertical hyphae, 12—15 × 4—7 μ; epibasidia four, early subglobose, later pyriform, broadest near the apex, 7—10 × 4—6 μ, finally with a short to rather long cylindric filament, and then up to 20 μ or more in length; spores globose to ovate, 4.5—9 × 4.5—6 μ, germinating by a slender-subulate promycelium.

On fir bark and on pine; July, November.

The foregoing description is largely taken from the authors cited; only some of the microscopic characters are given from direct observation. The species has been collected only infrequently, but seems to be well characterized by the structure of the basidiocarp and the form of the basidia and gloeocystidia.

Specimen examined:

Austria: Rekawinkel-Dürrwein, *F. von Höhnel* (in Höhnel's herbarium in Farlow Herb.), type (slide).

14. G. metachroa Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 265. 1924; Hym. Fr. 63. 1927.

Illustration: Bourdot & Galzin 1927.

Figure 11.

Fructification fairly thick, mucous-waxy, dusky hyaline, in drying darkening the substratum with a varnish-like film or disappearing; hyphae often short-celled, with frequent clamps, 2—3(—6) μ; gloeocystidia fusiform to broadly clavate-fusiform, blunt, thin-walled, with hyaline content, 20—35(—60) × 7—10 μ; probasidia clavate-capitate, the summit globose or broadly ovate, the stalk short, 8—12(—18) × 7.5—8(—12)μ; epibasidia commonly four, but frequently more, at first subglobose, soon inverted pyriform, 5—6(—7.5) μ broad, finally with a thick-cylindric filament, and then up to 15 μ long; spores subglobose to ovoid, attenuated at the base and depressed laterally, 5.5—6(—9) × 4.5—5(—8) μ, germinating by a conical promycelium.

Reported to occur throughout the year and on wood of both coniferous and broad-leaved trees; France.

Only a single dried specimen was available for study, and consequently the foregoing description is in large part taken from Bourdot & Galzin. The material apparently was considerably past its best development when collected, the gloeocystidia in particular being mostly collapsed and distorted, but nevertheless well differentiated and characteristic. The microdimensions run smaller than those published for *G. metachroa;* but the presence of gloeocystidia with hyaline content and the subglobose form of the probasidia and immature epibasidia appear diagnostic for the present species; since the form of the spores in the specimen is also that given by Bourdot & Galzin, it seems necessary to extend their measurements to include smaller material.

Specimen examined:

France: Barthe, *A. Galzin* (IX. 16. 1913), det. by Bourdot as *T. sordida* (comm. by Kew Herb.).

15. G. traumatica Bourdot & Galzin, Soc. Myc. Fr. Bull. 25: 32. 1909; Hym. Fr. 64. 1927.

Illustration: Bourdot & Galzin 1927.

Fructification thick, bossulate-undulate, gelatinous-waxy, then mucous, hyaline, opaline, or grayish, when dry rusty or brownish; hyphae guttulate, with clamps. 1.5—3 μ; gloeocystidia subcylindric, obtuse, sometimes forked, ventricose, or irregular, the content yellow, oily, then resinous, 80—210 ⩽ 5—16 μ; probasidia ovoid, 12—17 ⩽ 7—12 μ; epibasidia round, oblong, and finally with ovoid base and (?) cylindric filament; spores ovoid or ellipsoid, laterally attenuated at the base, 8—13 ⩽ 4—7 μ.

Throughout the year, on wood of broad-leaved trees already attacked; France.

The description given is that of Bourdot & Galzin. The species is notably well characterized, by its huge yellow gloeocystidia and slender-ellipsoid, slightly curved spores (see illustration cited).

16. G. opalea sp. nov.

Pileus resupinatus, crassus, vegetus opalino-griseus, siccus tenui-vernicosus, hyalinus; hyphae nodoso-septatae, 2—3 μ crassitudine; gloeocystidia claviformia, sinuosa, vel ramosa, obtusa, suco granuloso, ex hyalino fulvescente, plena, 50—80(—120) ⩽ 8—15 μ; probasidia clavato-capitata, vesiculo subgloboso 7.5 μ diametro et stipite 2—3 μ crassitudine, longo, composita; epibasidia ("sterigmata") vesiculo basale elliptico et filamento cylindrico composita, 10—20 ⩽ 3—5 μ; sporae oblongae vel subglobosae, lateraliter apiculatae, 4.5—6 ⩽ 3.5—4.5(—5.8) μ.

Figure 12.

Fructification thick, tough-mucous, the surface undulate or colliculose, when fresh lilaceous-opaline gray, drying to an entirely colorless varnish; hyphae mostly perpendicular to the substratum, infrequently branched, long-celled, very abundant, with clamps at all septa, 2—3 μ; gloeocystidia irregularly distributed, clavate, sometimes sinuous or irregularly branched near the apex, truncate-blunt, with highly refractive granular content, at first hyaline, later yellow, 50—80(120) ⩽ 8—15 μ; probasidia clavate-capitate, with well marked subglobose head about 7.5 μ in diameter and usually a notably elongate stalk 2.5—3 μ in diameter, the whole 10—25 μ in length; epibasidia early clavate-obovate, later with an elliptical base bearing a cylindric filament about 1.5—2 μ thick, the whole 10—20 ⩽ 3—5 μ; spores short-oblong or more rarely subglobose, laterally apiculate, 4.5—6 ⩽ 3.5—4.5(5.8) μ, germinating by a slender promycelium.

In large patches 10 cm broad on the underside of old aspen logs; April, May.

G. opalea differs conspicuously from all other species studied in the large amount of slender subicular mycelium; in the long-stalked basidial cells and frequent long subbasidial pedicel hyphae, which together serve to separate each basidium widely from its neighbors in crush preparations; in similar long pedicels which leave the gloeocystidia quite free from other organs. It differs from the other gloeocystidiate forms in the blunt-clavate

shape of its gloeocystidia; from *G. hyalina* and *G. cystidiophora* in the possession of clamps; from *G. metachroa* in the smaller dimensions of the hyphae, probasidia, epibasidia, and spores, in its notable color, and especially in the general structure of the basidiocarp as noted previously (see illustration of *G. metachroa* in Hym. Fr. 63); from *G. traumatica* in its stalked-globose, rather than ovoid, probasidium and in the much different shape of the spores. In the opinion of Litschauer, to whom a specimen was submitted for comparison with *G. hyalina*, the present form is an autonomous species. It probably lies closest to *traumatica;* but the form of its probasidia and gloeocystidia and the structure of its basidiocarp are distinctive and striking, and, it appears, unique.

Specimens examined:

Iowa: Turkey Creek, Johnson County, *M. C. Fisher & H. L. Dean*, V. 21. 1932 (in D. P. R. 146), type, and another collection (in D. P. R. 134).

17. G. pinicola (Bresadola) comb. nov.

Tulasnella pinicola Bresadola, Annal. Mycol. 1: 114. 1903; Saccardo, Syll. Fung. 17: 210. 1905; Bourdot & Galzin, Hym. Fr. 60. 1927; *Tulasnella vernicosa* Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 265. 1924; Hym. Fr. 61. 1927. *Tulasnella sordida* Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 265. 1924; Hym. Fr. 61. 1927; Pearson, Brit. Myc. Soc. Trans. 13: 72. 1928; Rea, Brit. Myc. Soc. Trans. 17: 49. 1932. *Tulasnella obscura* Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 265. 1924; Hym. Fr. 62. 1927. *Tulasnella Tulasnei* apud Rogers, Bot. Gaz. 94: 95. 1932.

Illustrations: Bourdot & Galzin 1927, Pearson, Rogers.

Figure 13.

Fructification thin to comparatively thick, mucous or waxy-mucous, undulate or even, when fresh hyaline, pinkish-, grayish-, or olivaceous-hyaline to translucent-plumbeous, sometimes pruinose, drying to a varnish-like film, colorless, yellowish, reddish, to fuscous; hyphae mostly perpendicular to the substratum, often with well-differentiated heavier vertical strands bearing clusters of basidia, clamps none or scattered or at every septum; gloeocystidia none; probasidia clavate to clavate-capitate, the stalk varying greatly in length, the summit subglobose to ovate, 9—20 (—30) $\times$ 6—9(—12) μ; epibasidia four or sometimes more, when first separated from the hypobasidium subglobose, but very soon elongate-ovate to ovoid-oblong, finally with a long cylindric (1—2 μ thick) or rarely almost subulate filament, the whole 9—20(—40) $\times$ 4.5—7 μ; spores subglobose to ovate, sometimes attenuated laterally at the apiculus, 6—10 (—12) $\times$ 4—6 μ, white in mass, germinating by a very slender promycelium.

On bark and decorticated wood of coniferous and broad-leaved trees throughout the year. Reported also on broom and on other fungi.

In the earlier paper by the present author this form was identified with *T. Tulasnei*, on the basis of Patouillard's figures (Journ. de Bot. 2: 270.

1888), the very long, tubular epibasidia shown resembling closely those of *G. pinicola*. It seems more likely that Patouillard's material was abnormal perhaps long saturated with water—or his sketches somewhat out of proportion. At any rate, the fructification of the fungus here described under *G. pinicola* is never more than very slightly rosy, and its spore-print is white, not pink: it thus appears that Bourdot & Galzin are correct in identifying *Prototremella Tulasnei* with the only ovoid-spored species having pink spore-print and basidiocarp—*T. violea*.

The anomalous basidial morphology ascribed to *T. vernicosa* certainly is the result of the species' being based on old, deliquescent fructifications, in which the hyphae and the hypobasidia which have have been exhausted in the formation of the epibasidia have had their walls largely gelatinized. In support of this interpretation, attention is called to the sketch in Bourdot & Galzin, and to the fact that the hyphae are given as very narrow, and that mention of the presence or absence of clamps is omitted—presumably because the hyphal walls did not show distinctly. Such fructifications have frequently been observed in the course of the present study. Spore and basidial characters as published fall well within those of *G. pinicola*.

The other two species mentioned in the synonymy apparently differ from *pinicola* only very slightly in microdimensions—almost they are included in it—and in color. But differences in color seem to be of no great weight, especially in such a form as this, with a slimy matrix, capable of taking color from the substratum; a clear plumbeous collection shows no difference in microscopic characters from the hyaline ones. According to Bourdot & Galzin *T. sordida* should be marked by the possession of much more slender hypo- and epibasidia. Material exhibiting such form, and which apparently represents that species, occurs among Iowa gatherings, and certainly is not even subspecifically distinct from material showing basidia of stouter form. Ovoid and clavate epibasidia occur together, in all proportions, in the collections studied, even among basidia of uniform maturity. Even so, it is greatly to be regretted that authentic material of *T. sordida* could not be examined, for final certainty upon this point. European specimens, which may have the form characteristic of this latter species more highly developed than it is in any of the material available for the present study, should be consulted. The descriptions and such material as is at hand tend to indicate that the species in question are not distinct, and, subject to correction, this conception of *T. pinicola* is here submitted.

Specimens examined:

Vermont: Dorset, *G. W. Martin 1224.*

Iowa: North Liberty, *D. P. R. 208;* Iowa City, *G. W. Martin 1171; D. P. R. 11, 115, 147, 152, 205, 210, 211, 212, 213;* Wellman, *G. W. Martin 394;* East Okoboji, *D. P. R. 207, 231;* Milford, *D. P. R. 183, 206, 219.*

Wyoming: Medicine Bow Mountains, *G. W. Martin 347.*

18. G. tremelloides (Wakefield & Pearson) comb. nov.

Tulasnella tremelloides Wakefield & Pearson, Brit. Myc. Soc. Trans. 6: 70. 1917; Rea, Brit. Basid. 740. 1922; Saccardo's Syll. Fung. 23: 578. 1925; Bourdot & Galzin, Hym. Fr. 61. 1927.

Illustration: Wakefield & Pearson.

Figure 14.

Fructification very thick, undulate-plicate, firm-gelatinous, when fresh deep purple, when dry blackish, horny; hyphae mostly ascending, with frequent ascending branches, without clamps, pallid purple, 3—5(—8) μ; glococystidia none; probasidia in fascicles, clavate, (15—)20 × (6.5—)7.5 μ; epibasidia when first separated from the hypobasidium sometimes obovate, but very soon elongate, clavate or oblong, finally fusiform, 14—24 × (3—)4.5 μ; spores ellipsoidal, laterally depresed, laterally apiculate, rather blunt or frequently greatly attenuated at the base, 6—9(—10) × 3.5—5.5 μ, germinating by a slender promycelium.

"On pine-needles on surface of ant's nest"; November; England.

A large, conspicuous, and highly characteristic species which nevertheless seems to have been collected but the once.

Specimen examined:

Great Britain: Surrey, Weybridge, *A. A. Pearson,* type.

19. G. calospora (Boudier) comb. nov.

Prototremella calospora Boudier, Journ. de Bot. 10: 85. 1896. *Tulasnella calospora* (Boudier) Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 23. 1897; Saccardo, Syll. Fung. 14: 235. 1899; 17: 210. 1905; Bresadola, Ann. Myc. 1: 114. 1903; Burt, Mo. Bot. Gard. Ann. 13: 328. 1926; Bourdot & Galzin, Hym. Fr. 57. 1927; Pearson, Brit. Myc. Soc. Trans. 13: 72. 1928; Rea, Brit. Myc. Soc. Trans. 17: 49. 1932. *Muciporus deliquescens* Juel, Bih. Svensk. Vet.-Akad. Handl. 23, Afd. 3 (12): 24. 1897; Saccardo, Syll. Fung. 14: 235. 1899. *Tulasnella deliquescens* Juel, Ark. Bot. 14 (1): 8. 1915. *Tulasnella helicospora* Raunkiaer, Bot. Tidsskr. 36: 205. 1918; Saccardo's Syll. Fung. 23: 578. 1925. *Tulasnella rosella* Bourdot & Galzin, Soc. Myc. Fr. Bull. 39: 263. 1924; Hym. Fr. 58. 1927.

Illustrations: Boudier, Juel 1897, Raunkiaer, Bourdot & Galzin 1927, Pearson.

Figure 15.

Fructification thin, gelatinous-waxy or waxy, when fresh pale neutral or pinkish gray, heavily rimose with spores, becoming whitish with drying and finally reduced to a pale grayish bloom or invisible; hyphae mostly parallel to the substratum, sparsely branched, without clamps, 3—6 μ; no glococystidia; probasidia globose, long-stalked, 12—20 × 8—14 μ; epibasidia usually four, occasionally more, when first separated from the hypobasidium globose, 7—11 μ, later becoming ovate to oblong, with a cylindric tubular filament produced from the apex, 15—20(—35) μ long; epi-

basidia and occasionally probasidia occur set free by disintegration of the supporting cell; spores cylindric and straight, slightly or strongly arcuate, sigmoid, or helicoid, tapering abruptly at the ends, the apiculus marked, (12—)15—52 × 3—4 μ, germinating by one or occasionally several long, subulate promycelia, producing secondary spores notably smaller, but of the same form as the basidiospore.

On bark and decorticated wood of oak and on moss; May, June. Reported on bark and wood of various broad-leaved trees, on old rags, and on leaves; throughout the year.

On the basis of texture alone most collections of this species would be placed in *Tulasnella*. In morphology, however, it clearly belongs in *Gloeotulasnella*, and there seems to be present, although scantily, such a mucilaginous matrix as characterizes the thicker species. The curvature of the cylindric spores is various, and hardly seems deserving of taxonomic recognition, even if it be constant within the various forms.

Specimens examined:

Maine: Kittery Point, *R. Thaxter*, det. E. A. Burt (in Mo. Bot. Gard. Herb. 57477).

Iowa: Iowa City, *D. P. R. 155, 160, 161.*

Species excludendae.

T. grisea (Raciborski) Saccardo & Sydow, Syll. Fung. 16: 203. 1902. *Pachysterigma grisea* Raciborski, Parasit. Alg. u. Pilze Java's 1: 30. 1900.

From the description, which notes sterigmata 5 μ long on basidia 16 × 10 μ, it appears certain that this fungus can be no *Tulasnella*. An examination of authentic material reveals no indubitable basidia or spores, but only coarse hyphae, 7—12 μ thick, branching at right angles, abundant within the leaf and forming a thin layer on the under surface, apparently with the emergent hyphae passing out in fascicles through stomata or small openings where the epidermis is ruptured. They are the hyphae of the parasitic species of *Corticium*, like *C. vagum*, and the present form apparently is to be identified with some already described member of that genus or else transferred to it as an additional species. Study of fertile material is necessary.

Specimen examined:

Java: Buitenzorg, *Raciborski 41* (in Herb. Bot. Gard. Buitenzorg 6926), type (?).

T. anceps Bresadola & Sydow, Ann. Myc. 8: 490. 1910; Saccardo, Syll. Fung. 21: 452. 1912; Wakefield, Brit. Myc. Soc. Trans. 17: 7. 1932; Rogers, Bot. Gaz. 94: 97. 1932.

Corticium anceps (Bresadola & Sydow) Gregor, Ann. Myc. 30: 464. 1932.

Illustration: Rogers.

As noted in the earlier paper, an examination of material of this fungus shows that it is no *Tulasnella*. Rather it properly belongs, as stated by Gregor, among the fungi grouped by Bourdot & Galzin in the section *Bo-tryodea* of the genus *Corticium*. Since it agrees with none of the forms described there, it may best stand, at least for the present, under the name *Corticium anceps* Gregor.

Specimen examined:

Germany: Mecklenburg, near Graal, *H. Sydow*, in Mycotheca germ. 858.

The writer desires to express here his heartiest thanks to Dr. G. W. Martin, for his encouragement and assistance in this study of the *Tulasnellaceae*. Thanks are also due to the Abbé H. Bourdot for his valued suggestions concerning the taxonomy of the group; to Dr. G. T. Moore and Dr. C. W. Dodge for their kindness in making accessible the library and herbarium of the Missouri Botanical Garden; and to Professor V. Litschauer of Innsbruck, to Sir Arthur Hill and Miss E. M. Wakefield of Kew, to Mrs. L. W. Riddle of the Farlow Herbarium, to Dr. D. F. van Slooten and Dr. K. D. Boedijn of Buitenzorg, and to the Iowa mycologists whose gatherings are listed, for their courtesy in supplying much of the material upon which this study is based.

Material of all species examined and here retained as autonomous is deposited in the mycological herbarium of the State Unitersity of Iowa, except for *T. grisea* and *G. hyalina*, the valuable and scanty type specimens of which were returned to the herbaria from which they had been borrowed.

University of Iowa.
Iowa City, Iowa.

Explanation of figures.

Plates VI—VII.

Figs. [10] 1—8, *Tulasnella:* Fig. 1, *T. violea* — a, leg. Bourdot; b, Litschauer 1; c, 194; d, 204; e, 192 (spore germinating by conidia); f, type of *T. microspora;* g, 196; h, 32; i, 33. Fig. 2, *T. violacea* — a, 34; b, 169; c, Litschauer 4; d, 162; e, 170; f, 131. Fig. 3, *T. fuscoviolacea* — a, Overholts 4883; b, Lundell 450; c, Litschauer 3. Fig. 4, *T. rutilans* — a, Neuhoff; b, 151. Fig. 5, *T. allantospora* — a, Martin 1161; b, type; c, 136. Fig. 6, *T. lactea* — a, Martin 1194; b, 182. Fig. 7, *T. bifrons* — a, 163; b, 181; c, 2. Fig. 8, *T. pruinosa* — a, Martin 1007; b, 236; c, Jaap 334; d, 235.

Figs. 9—16, *Gloeotulasnella:* Fig. 9, *G. cystidiophora*, type. Fig. 10, *G. hyalina*, type. Fig. 11, *G. metachroa*, Galzin. Fig. 12, *G. opalea* — a, 134; b, 146. Fig. 13. *G. pinicola* — a, Martin 394; b, 147; c, 152. Fig. 14, *G. tremelloides*, type. Fig. 15, *G. calospora* — a, 155; b, 160; c, 158.

[10] All figures drawn with camera lucida at magnification 2490 x and reduced in reproduction to 1000 x, excepting the two gloeocystidia in Fig. 12 a, drawn at 780 x and reduced to 313 x. Specimens listed by number only are D. P. R.

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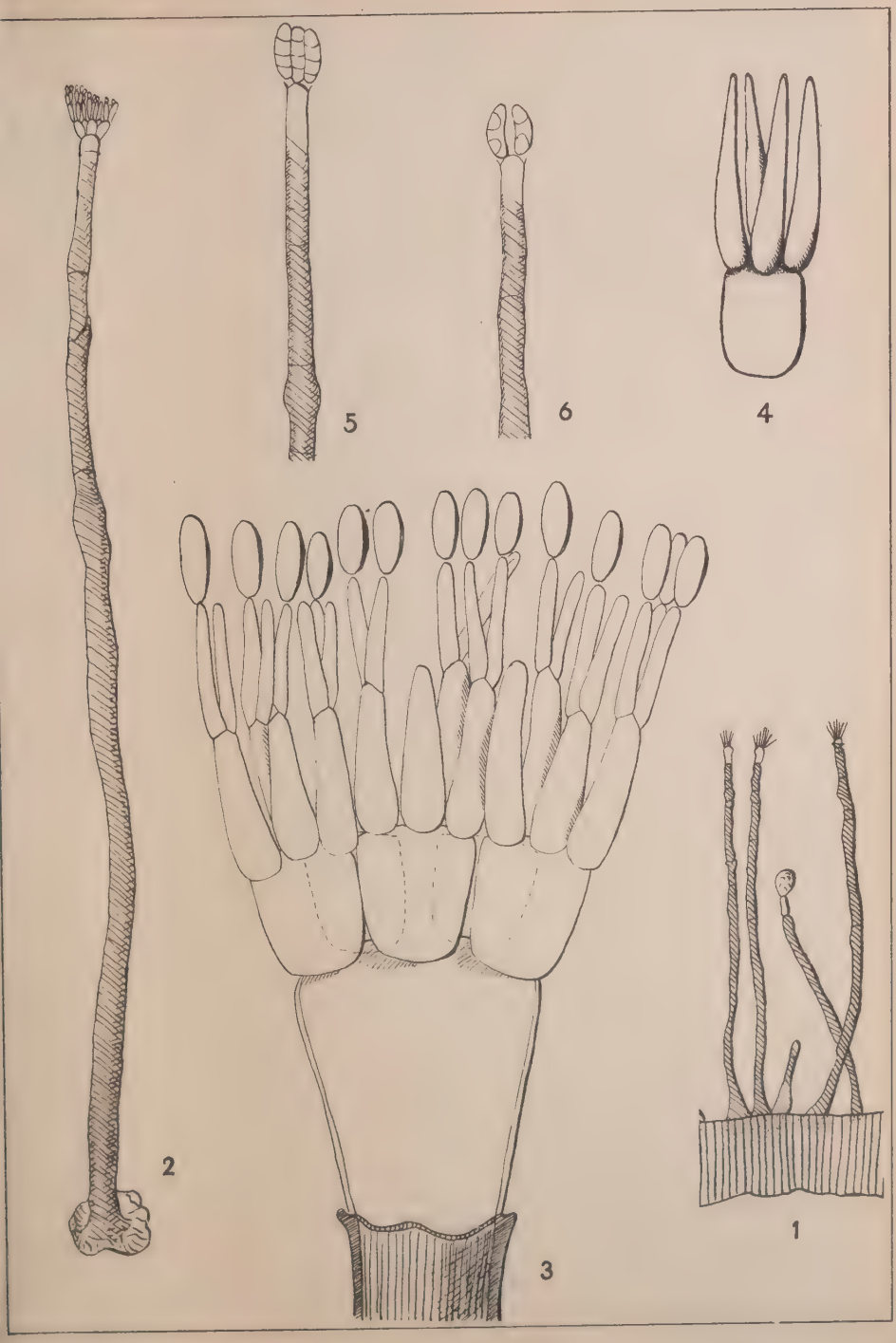

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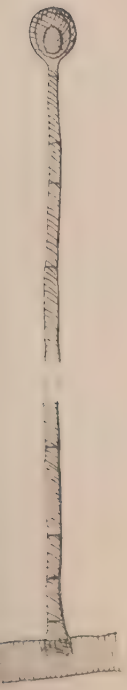

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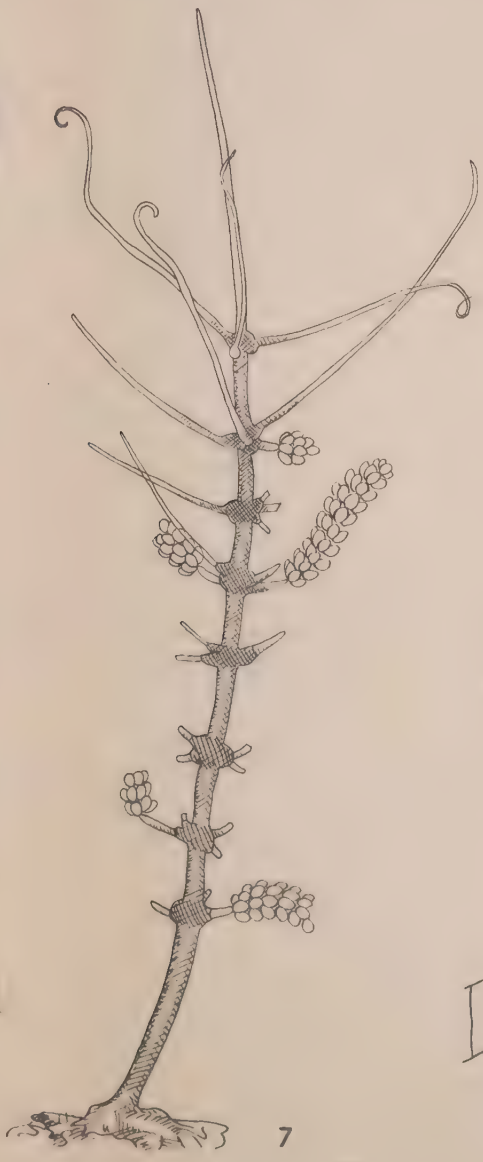

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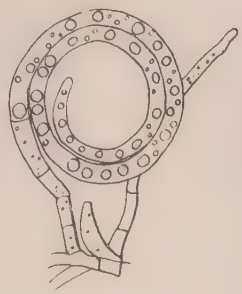

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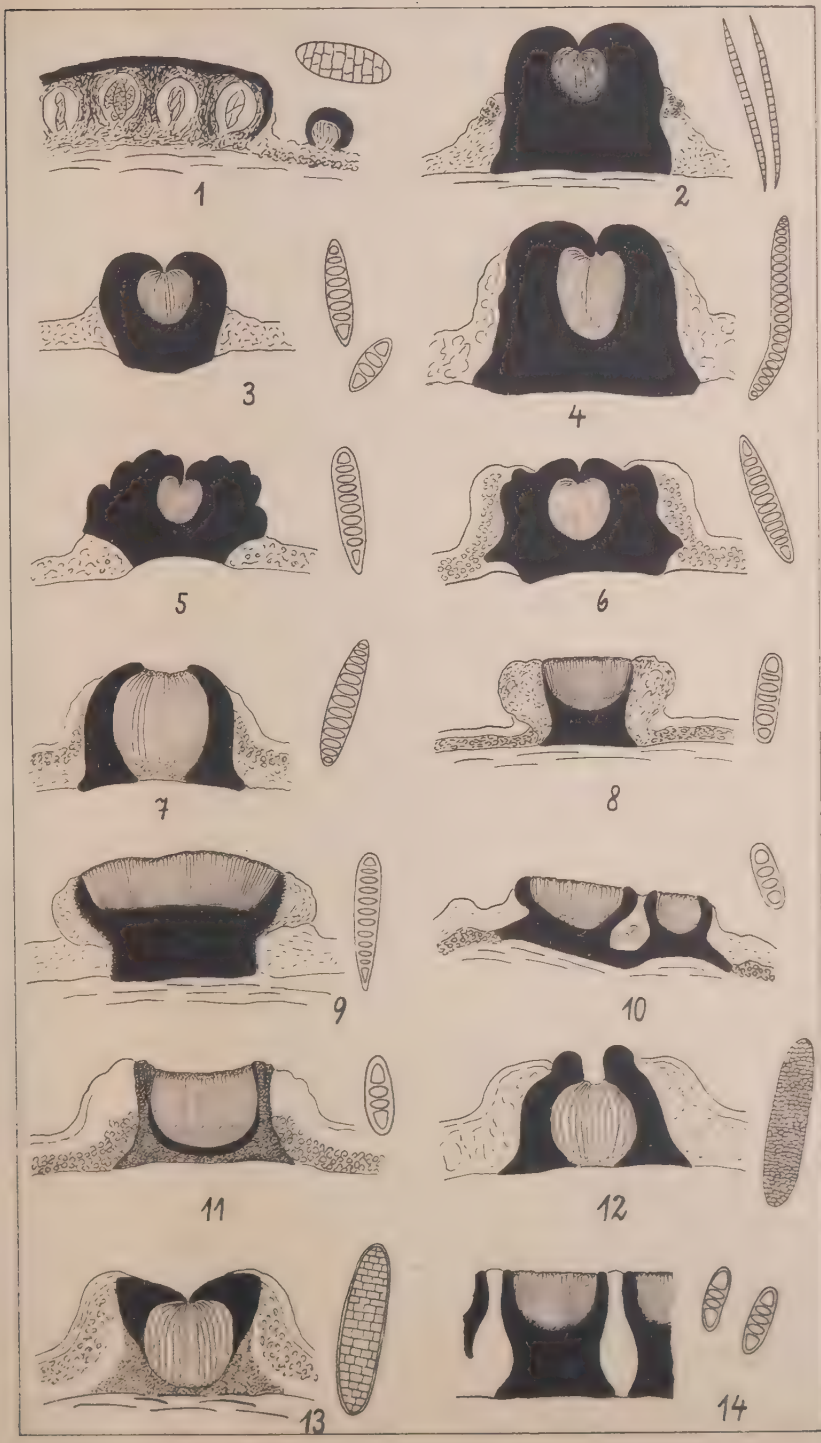

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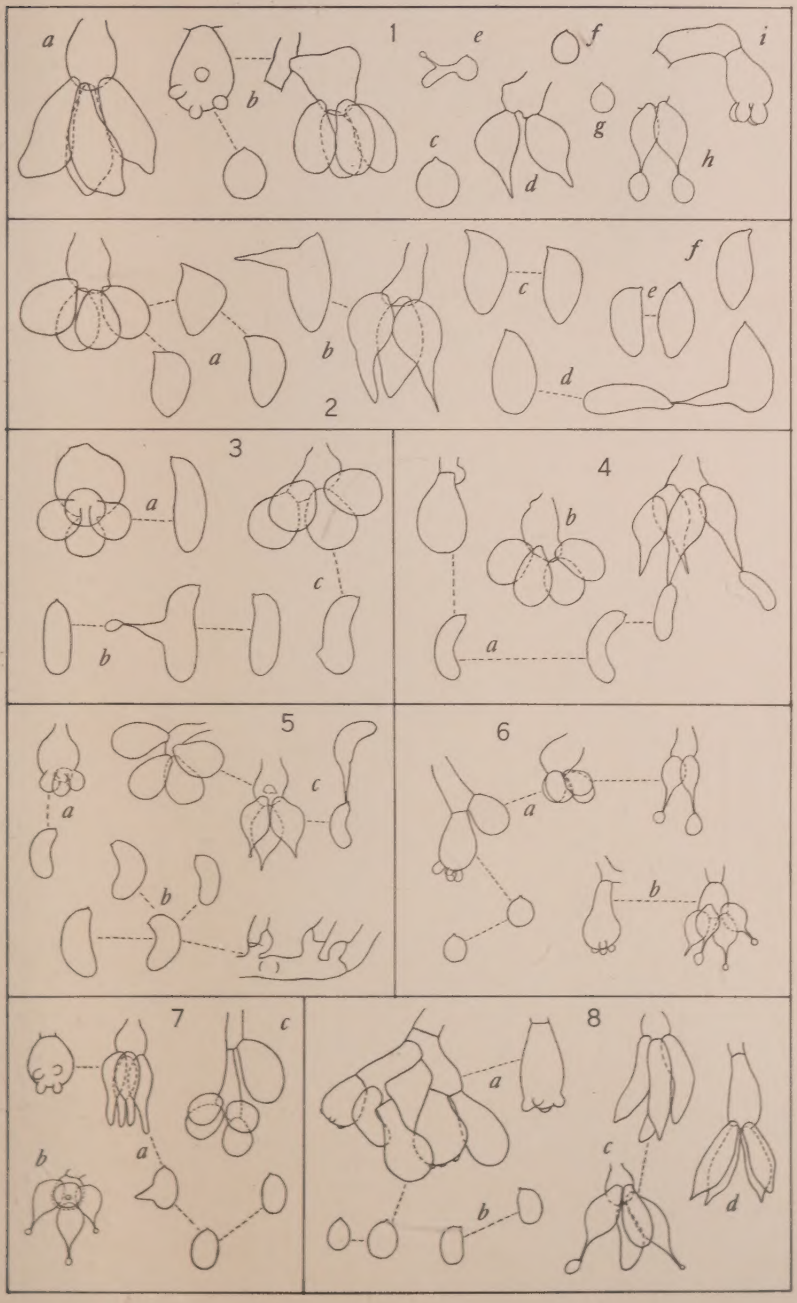

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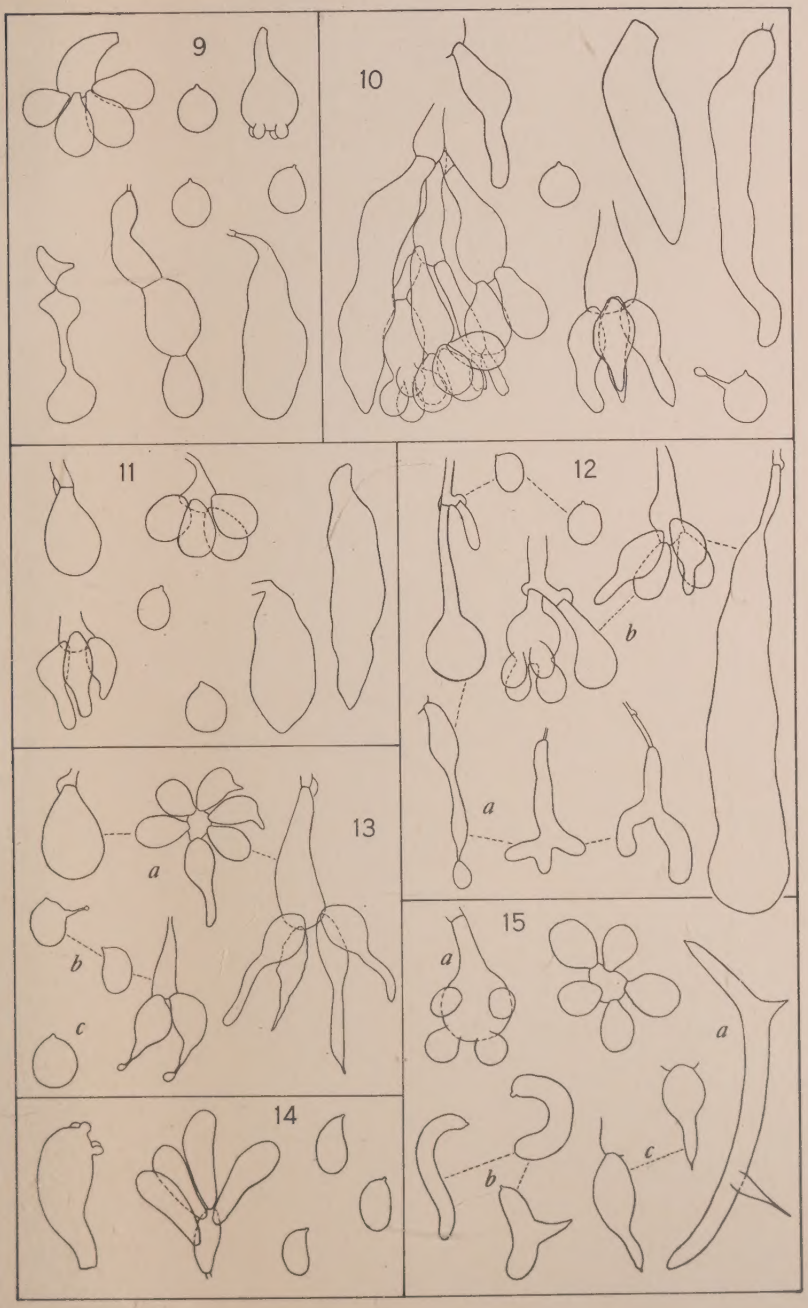

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